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THE PHASE I ARCHEOLOGICAL RESEARCH PROGRAM FOR THE KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE

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THE PHASE I ARCHEOLOGICAL RESEARCH PROGRAM FOR THE KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE, PART IV: INTERPRETATION OF THE ARCHEOLOGICAL RECORD

Edited by
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LIST OF ABBREVIATIONS USED

The following abbreviations/acronymns appear in the four parts of this volume:

BP	before the present (calculated from AD 1950)
C-14:	carbon-14, or radiocarbon
IASP	Interagency Archeological Salvage Program
KNRI	Knife River Indian Villages National Historic Site
KRF	Knife River Flint
MWAC	Midwest Archeological Center
MNI	minimum number of individuals
NARS	National Archives and Records Service
NISP	number of identified specimens
NPS	National Park Service
RCYBP	radiocarbon years before present (calculated from AD 1950)
SHSND	State Historical Society of North Dakota
SIRBS	Smithsonian Institution River Basin Surveys
SMU	Southern Methodist University
TL	thermoluminescence
TRSS	Tongue River Silicified Sediment
UGA	University of Georgia
UND	University of North Dakota
WU	Washington University

PREFACE

In 1974, the Congress of the United States authorized the establishment of the Knife River Indian Villages National Historic Site in Mercer County, North Dakota, to preserve archeological vestiges of the Hidatsa and Mandan Indians and to commemorate the cultural history and lifeways of those important native peoples of the Northern Plains. Starting in 1976, the National Park Service undertook an extensive program of archeological and ethnohistorical research designed to illuminate the archeological and historical resources of the newly-authorized park. This research, which was termed the Phase I research program for the park, was cooperatively carried out by the Service's Midwest Archeological Center and the Department of Anthropology of the University of North Dakota, as well as by researchers at other academic institutions in the United States, most notably the Department of Anthropology of the University of Missouri-Columbia.

This volume of the Midwest Archeological Center's *Occasional Studies in Anthropology* series reports the results of that decade-long research program. It is issued in four parts, each of which deals with a particular aspect of the research. Part I (Chapters 1-10) describes the overall program in general, particularly emphasizing the objectives and methodology employed in the research. Part II (Chapters 11-16) recapitulates a series of ethnohistorical studies that complements the archeological research and provides an ethnohistorical backdrop against which the archeological record of Hidatsa culture change can be interpreted. Part III (Chapters 17-21) summarizes the analysis of various classes of material remains recovered during the research program, principally the pottery, lithics, modified and unmodified fauna, and Euroamerican trade goods. Part IV (Chapters 22-27) broadly interprets the park's archeological record and offers a revised culture-historic taxonomy for what is proposed as the Knife region of the Middle Missouri subarea.

Most of the chapters contained in this volume were completed circa 1985-1986. Some effort has been made to update aspects of the data and conclusions offered in them by referencing certain key published and unpublished studies which have appeared since that time, but the lack of time and funds has precluded a comprehensive revision of the entire corpus of papers contained herein. Nevertheless, it is believed that this summary of the Knife River Indian Villages Phase I research program will be of substantial interest to Plains scholars and considerable utility in telling the story of the Hidatsa and Mandan Indians to the public.

CHAPTER 22

QUATERNARY GEOLOGY OF THE KNRI

Jon Reiten and Stanley A. Ahler

INTRODUCTION

Study of the Quaternary age geology (Pleistocene and Holocene periods) in the KNRI was conducted by Jon Reiten in the period 1978 through 1983, following a pilot study conducted by Lee Clayton in 1976 (Clayton 1976). Fieldwork was conducted by Reiten in 1978 and 1979 and data analysis and reporting occurred in the subsequent period through 1983. This research was supported jointly by the National Park Service, the Department of Geology at the University of North Dakota, the North Dakota Geological Survey, and the Faculty Research Committee at the University of North Dakota. The geologic research has been reported more fully in a previous paper (Reiten 1980) and in a Master's thesis prepared by Reiten on the subject (1983). Here we provide a synopsis of the major findings of the geologic investigation, focusing specifically on the area bounded by the KNRI and on matters relevant to the location and interpretation of archeological and historical resources within the KNRI.

The geologic study area consists of a 9 by 14 mile rectangle (126 square miles or 326 square kilometers) encompassing the Missouri River valley from just below the Garrison Dam to about two miles south of Stanton, and the Knife River valley from its mouth to a point about six miles due west (Reiten 1983:Plate 2). Emphasis has been placed on examination, description, and interpretation of the Quaternary geologic record within the KNRI, which lies in the southern half of the study area at the juncture of the Knife and Missouri rivers. Field methods used in the study include description and correlation of drill cores generally ranging from four to more than 15 m in depth which were taken at a total of 35 locations within the study area and description and correlation of core samples ranging up to 5.0 m in depth below surface which were taken with a Giddings probe at a total of eight locations within the study area (see Reiten 1983:Appendices A and B). The study has also involved on-the-ground reconnaissance throughout the study area; examination and documentation of numerous cutbank exposures along the Knife and Missouri rivers and in artificial cuts and exposures in the study area; detailed inspection and interpretation of existing vertical aerial photographic coverage for the study area; and comparative examination of terrace sequences and cutbank exposures at various locations along the Missouri River ranging from shoreline cuts along the Garrison Reservoir (Lake Sakakawea) north of the study area to similar exposures along the Oahe Reservoir in the vicinity of Mobridge, South Dakota.

The purpose of the geologic investigation has been to determine the depositional history of Quaternary landforms and sediments within the KNRI and the immediately surrounding area by mapping, stratigraphic investigations, and radiocarbon dating. The results of the study can be used to predict the locations of certain classes and ages of cultural material, to interpret evidence of Holocene climatic fluctuation, and to better understand the history of the Missouri and Knife rivers in central North Dakota.

LANDFORMS

Several distinctive landforms can be identified in the study area, some of which occur within the boundaries of the KNRI proper. The largest scale landforms consist of *meltwater channels* which comprise the present Knife and Missouri river valleys. These two valleys or channels exhibit contrasting properties which indicate that the respective valleys are of different ages. The Knife River valley is the older of the two channels, exhibiting greater valley width, gentle valley slopes, long tributaries, and multiple paired terraces along the valley slopes. The Knife River flows west to east along the axis of a preglacial drainage (Carlson 1973:49). In contrast, the Missouri River valley exhibits properties of a younger channel, such as steep, heavily dissected valley walls, short tributaries graded to the lowest Pleistocene terrace, and an absence of older terraces, particularly near the Garrison Dam in the north end of the study area. The Missouri River channel is oriented north to south and crosscuts the older Knife River valley.

Terraces are flat to gently undulating surfaces located in the valley slope and valley bottom physiographic regions. Terraces identified in this study are interpreted as former river floodplains, but one terrace may be a former strandline of a proglacial lake. The former floodplains are preserved as terraces by incision of the valley bottoms during periods of stream downcutting. Five Pleistocene age terraces have been identified and named in the study area, from highest to lowest (oldest to youngest): the Riverdale Terrace, Sakakawea Terrace, McKenzie Terrace, Hensler Terrace, and Stanton Terrace. Three Holocene age terraces are identified and named in the study area: the A Terrace, the B1 Terrace, and the B2 Terrace. The lower two of the Pleistocene age terraces and all three of the Holocene age terraces occur within the KNRI (Figure 22.1). Terraces are one of the most important Quaternary age landforms in the region because their ages of formation can be placed in relative chronological sequence and sediments within the more recent terraces can be dated directly by radiocarbon techniques. This in turn provides indirect evidence of climatic change in the region as well as clues to where cultural remains can be expected to occur or not occur upon or beneath the present ground surface. Considerable attention in the study was focused on dating the terraces and interpreting them from the perspective of implications for climatic change.

Other geologic landforms which occur in the study area but outside of the KNRI include *linear ridges* thought to reflect movement of glaciers across the landscape, *alluvial islands* occurring in the Missouri River, and several fields of *sand dunes*. Also occurring within the KNRI are former river *meander scars*, *point bars*, and *cutbanks*. The latter features offer the best natural exposures of Quaternary age sediments along both the Knife and Missouri rivers. Each of these landforms is described more fully in Reiten (1983:13-30).

Landforms in the study area which are principally of biological origin include the major *earthlodge villages* which consist of refuse heaps, accumulations of sediments used for earthlodge coverings, and purposefully constructed linear earthen ridges extending outward from some of the villages. Also identified are several parallel and intersecting *linear trenches* up to 1 m deep, 10 m wide, and 3 km long. These features are conspicuous on aerial photographs. Such features associated with the earthlodge villages are interpreted to be foot and horse trails linked to human use of those villages. Other trenches, generally trending from northwest to southeast are common in areas removed from the villages and west of the Missouri River, and most or all of these are interpreted to be bison trails (cf. Clayton 1975).

LITHOSTRATIGRAPHIC UNITS

Lithostratigraphic units identify the surficial sediment in the study area. Such units include sediment deposited by glaciers, wind, rivers, slopewash, and in lakes. A unit generally had to be at least a meter in thickness for it to be mapped in the study area (Reiten 1983:Plate 2). A total of seven lithostratigraphic units are identified in the study area, and these can be classified according to three geological formations previously defined for North Dakota. The oldest such unit consists of undifferentiated Bullion Creek and Sentinel Butte Formation sediments of Paleocene age which crop out along streams and hillslopes where younger material has been removed by erosion. This lithostratigraphic unit (unit 1) does not crop out within the KNRI.

The next three units are all assigned to the Pleistocene age Coleharbor Formation (Bluemle 1971:17). This formation includes glacial till (unit 2), fluvial and glaciofluvial sand and gravel (unit 3), and lake-deposited silt and clay (unit 4). These lithostratigraphic units crop out extensively within the study area, occurring throughout most of the valley slope and upland physiographic settings. Glacial till (unit 2) occurs along the north and east facing slope of the Hensler Terrace as it occurs in the southern part of the KNRI (Figure 22.1), but nowhere else within the KNRI. Pleistocene age fluvial and glaciofluvial deposits (unit 3) occur throughout most of the Stanton Terrace surface as it is mapped in the southern part of the KNRI and throughout both the Stanton Terrace and Hensler Terrace surfaces as mapped in the northern part of the KNRI (Figure 22.1) (cf. Plate 2 in Reiten 1983). Pleistocene age lake deposits classifiable as part of the Coleharbor Formation (unit 4) do not occur within the KNRI.

The final three units are all assigned to the terminal Pleistocene through Holocene age Oahe Formation (Clayton et al. 1976; Clayton and Moran 1979). These consist of windblown silt (loess) (unit 5), windblown sand (unit 6), and river-deposited and slopewash sands, silts, and clays (alluvium and colluvium) (unit 7). These three units are often interbedded with each other and they overlie the older Coleharbor Formation, Bullion

Creek Formation, and Sentinel Butte Formation sediments. Oahe Formation lithostratigraphic units crop out extensively within the KNRI. Eolian silt or loess (unit 5) covers most of the Hensler Terrace surface as it is mapped in the southern part of the KNRI, as well as smaller portions of the Stanton Terrace surface in that part of the KNRI as well (Figure 22.1). Unit 5 also caps much of the Stanton Terrace surface and portions of the Hensler Terrace surface as mapped in the north end of the KNRI (Figure 22.1). Holocene age windblown sand (unit 6) covers an area of several square km just west of the KNRI and south of the Knife River (cf. Plate 2, Reiten 1983), but it is mapped within the KNRI only in a small area on the eastern facing slope of the Hensler Terrace north of the Knife River (Figure 22.1). Unit 7, consisting of Holocene age colluvium and alluvium, is mapped over a broad area within the KNRI, with its occurrence coinciding primarily with the A, B1, and B2 Terrace areas mapped in Figure 22.1. These three units (5, 6, and 7) are of primary interest with regard to cultural resources within the KNRI. Due to their Late Pleistocene through Holocene ages, they each have the potential for containing buried, stratified cultural horizons.

Unit 5, consisting of windblown silt in the Oahe Formation, has in other areas been subdivided into four members: Mallard Island, Aggie Brown, Pick City, and Riverdale (Clayton et al. 1976). The Mallard Island Member is a pale-brown silt which is thought to be Late Pleistocene in age. The overlying Aggie Brown Member consists of a brown to very dark brown silt also identified as the Leonard Paleosol (Bickley 1972). It is thought to be terminal Pleistocene to early Holocene in age (circa 13,000-8,000 BP) (Clayton et al. 1976:11-12), and therefore has the potential to contain evidence of very early human occupation. The estimated age of the Aggie Brown Member has so far been substantiated by radiocarbon dates of soluble humates in this unit, as exposed at the Flaming Arrow site (32ML4) within the region (cf. Table 8.1 concerning the KNRI chronometric program), and in archeological sites in the Knife River flint quarry area in Dunn County (Kay et al. 1984:70). The presence of the Aggie Brown/Leonard Paleosol is interpreted to reflect cool and/or moist climatic conditions during which time a heavy vegetation cover existed on the ground surface and hillslope erosion would have been minimal (Clayton et al. 1976:8, 9, 12). The overlying Pick City Member consists of a light gray to pale yellow silt, generally thought to be mid-Holocene in age (8,500-5,000 years BP). It is thought to reflect a period of minimum vegetation cover, lower precipitation, and maximum rates of hillslope erosion (Clayton et al. 1976:8, 9, 12). The uppermost Riverdale Member is a grayish brown silt with internal horizonation. It is thought to be Late Holocene in age (5,000 BP to present) and to reflect alternating episodes of stable and unstable hillslope erosion under conditions of varying precipitation, containing in many outcrops a dark buried horizon identifiable as the Thompson Paleosol (Bickley 1972).

All four members of unit 5, eolian Oahe Formation silt, occur in some exposures atop the Hensler Terrace and higher terraces in the study area. Only the upper three members are thought to occur atop the Stanton Terrace, and several exposures of these three members have been documented within the KNRI. Each holds the potential for containing buried archeological deposits up to 11,500 years in age. One such exposure is in the wall of an artificial trench at the Scovill site (32ME409) (Ahler and Mehrer 1984:Figures 33 and 34); a similar sequence was exposed in a test excavation at the nearby Hump site (32ME414), also on the Stanton Terrace (Ahler and Mehrer 1984:Figure 57). Excavations to Stanton Terrace gravels in the Poly site revealed only the presence of the Riverdale Member and possibly part of the Pick City Member at that location (Ahler and Mehrer 1984:Figure 26).

Unit 6, windblown sand which is largely Holocene age, consists of light yellowish brown to very dark brown, well-sorted, fine- to medium-grained sand which is in places up to 10 m thick. Dark colored bands, interpreted as humic horizons or paleosols, have been observed at two different stratigraphic levels in unit 6 in exposures in active dunes west of the KNRI. The humic horizons are thought to reflect periods of increased precipitation and dune stability due to heavy vegetation cover. Various lines of evidence indicate that the uppermost humic horizon may date to about 325 years BP (cf. Reiten 1983:47; Fischer 1980:38-39). The lower paleosol in unit 6 is presently undated. Unit 6 grades laterally in several areas into the eolian silt of unit 5. This seems to be the case in the windblown sediments which overlie the Hensler Terrace gravels at the Lower Hidatsa West site (32ME499). There, sandy silt grades downward into silty sand up to two meters in depth, and a buried, discontinuous humic zone occurs at the base of the sand overlying the Hensler gravels.

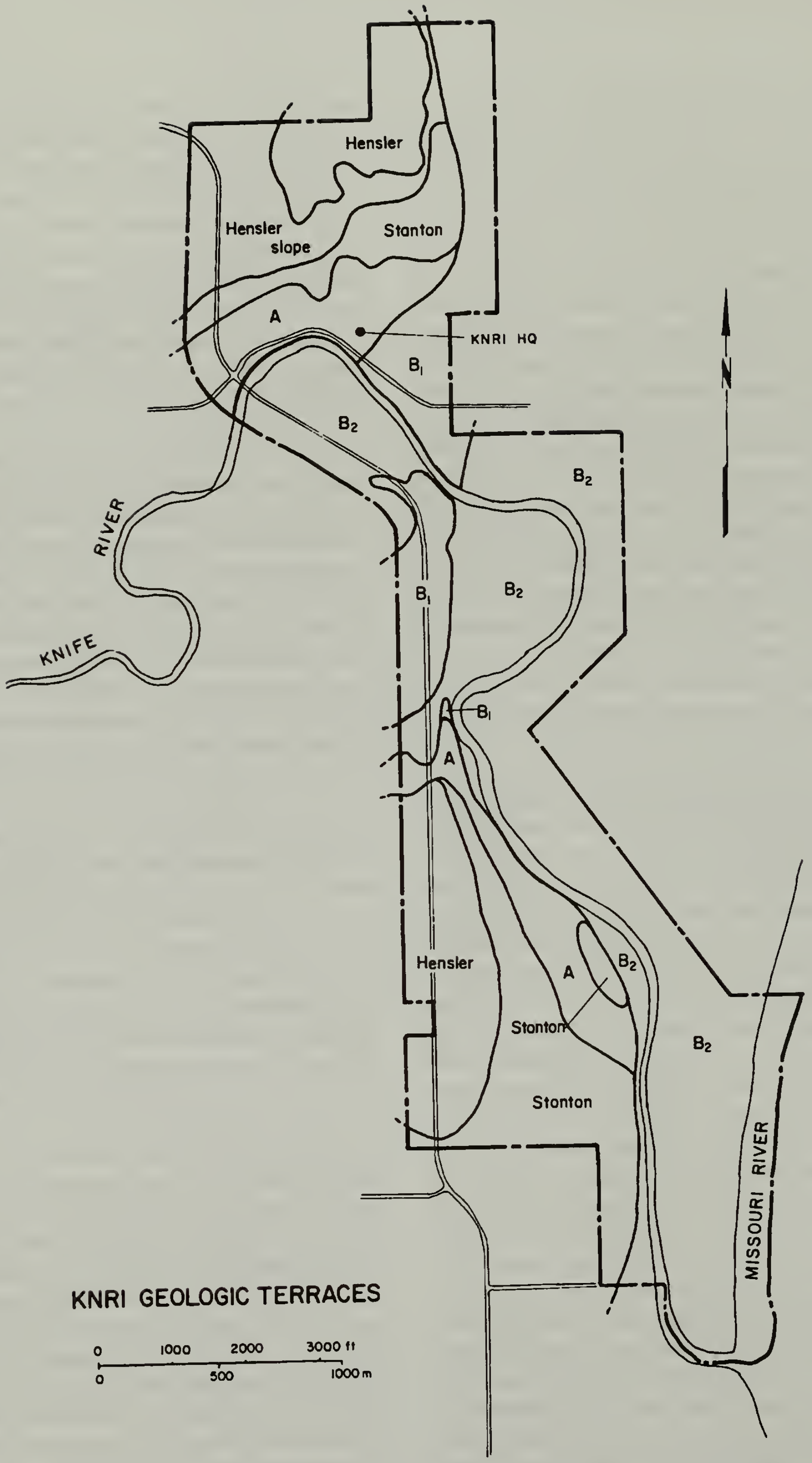

Figure 22.1. Map of the KNRI showing the location of defined geological terrace surfaces (morphologic map units).

Unit 7, the alluvial and colluvial unit also assigned to the Oahe Formation, consists of silt, clay, sand, and gravel. The colluvium in unit 7 consists primarily of silt and silty clay washed downslope from glacial till, older terraces, and loess deposits; in some cases, the unit 6 colluvium is physically indistinguishable from the parent material occurring immediately upslope. The much more extensive alluvial deposits in unit 6 consist primarily of light yellowish brown calcareous clay, silt, and very fine- to coarse-grained sand interlayered with darker zones of darker grayish brown silt, clay, and sand. This material is alluvium deposited in river channels and floodplains, and it ranges from less than one meter to more than 12 meters in thickness. This unit is fully Holocene in age and it underlies Terraces A, B1, and B2 (Figure 22.1) which will be described more fully in the following sections.

MORPHOLOGIC UNITS AND TERRACE CHRONOLOGY

Mapped morphologic units in the study area (Reiten 1983:Plate 2) consist of units designated as uplands and slopes as well as the five previously identified Pleistocene terraces and the three Holocene terraces. Heavily bioturbated land, such as that associated with lignite mining at the Glenharold Mine south of the KNRI, comprises a final morphologic unit mapped in the study area (Reiten 1983:Plate 2).

Uplands consists of the region above the Missouri and Knife river valleys which is characterized by rolling hills interspersed with closed depressions and sloughs. The uplands are an unterraced Paleocene age bedrock surface mantled with a thin layer of glacial, eolian, alluvial, and lacustrine sediment. The uplands are differentiated by topography, elevation, and lack of associated fluvial sediment. This unit generally has more relief than terraces but less than the slopes, and the 600 m contour marks the lower contact with the Riverdale Terrace or slopes.

Slopes consist of breaks between terraces or between the uplands and the highest terrace present. Included here are badlands (up to 90 degree slopes) and smooth breaks between terrace units; slopes are usually at least partially covered with colluvium. Individual slope exposures vary in age, but are younger than the terrace unit immediately above them.

The *Riverdale Terrace* is the highest terrace mapped. It is named for the village of Riverdale which is located on this surface about 1 km northeast of Garrison Dam. This terrace forms a flat to gently undulating surface gradually sloping toward the valleys, with slopes less than 5 degrees. The Riverdale Terrace is located between elevations of 579 and 600 m in the study area, between 67 and 90 m above river level. This terrace is difficult to differentiate from the uplands in some locations, and for this reason the 600 m elevation is chosen as the arbitrary division between this unit and the uplands.

The Riverdale Terrace is a cut terrace containing little or no fluvial sediment. The typical stratigraphic section contains Paleocene fluvial sediment overlain by 1 m of gravel overlain by 1-2 m of glacial till overlain by less than 1 m of loess. The Riverdale Terrace is interpreted as a former fluvial floodplain which was later incised to form the terrace. Subsequent deposition on and erosion of the terrace surface makes it more difficult to identify than the other terraces. It is the oldest terrace identified. Its absolute age is unknown, but it is probably pre-Wisconsinan and post-Pliocene.

The *Sakakawea Terrace* forms a nearly level surface at about the same elevation as the maximum pool level of Lake Sakakawea and therefore is named after the lake. The Sakakawea Terrace is located between elevations of 560 and 570 m, between 51 and 61 m above river level. This terrace consists of a flat to gently undulating surface sloping toward the valleys. Like the Riverdale Terrace above it, the Sakakawea Terrace is a cut terrace with little associated fluvial sediment. A typical section would contain the same sequence described previously for the Riverdale Terrace, having been modified after its formation by glacial deposition and stream and slopewash erosion. It is probably pre-Wisconsinan in age.

The *McKenzie Terrace* is located at a mean elevation of 548 m, with parts of this terrace present between 33 and 42 m above river level. The McKenzie Terrace is named after Lake McKenzie which filled during the Late Wisconsinan and occupied parts of the Missouri valley at about this same elevation (Bickley 1972:117). The McKenzie Terrace is a flat to gently sloping surface in the study area, preserved as either a terrace cut into Paleocene sediments or glacial till, or as a fill terrace underlain by sand and gravel. Much of the McKenzie surface is overlain by up to 10 m of eolian sand or up to 5 m of eolian silt. An exposure of this terrace about 500 m north of the KNRI contains high-angle, cross-bedded gravel interpreted as back-beach deposits of proglacial Lake McKenzie. The McKenzie Terrace is differentiated by its flat surface within its specific elevation limits. It is probably Late Wisconsinan in age but may be older.

The *Hensler Terrace* is named after the village of Hensler which lies on this surface at a location about 19 km southeast of the study area. The Hensler Terrace is located between elevations of 527 to 542 m, between 13 and 32 m above river level. It forms a flat to gently undulating surface with slopes of less than 5 degrees. The Hensler Terrace is generally a fill terrace composed of up to 16 m of fluvial sand and gravel. The terrace fill is capped by up to 10 m of eolian sand or up to 5 m of eolian silt (lithostratigraphic units 6 and 5, respectively). An exposure west of the KNRI contains evidence that the Hensler fill was deposited on stagnant glacial ice in that location. The Hensler Terrace is interpreted to have formed at two different times. It was partially formed in Late Wisconsinan times, then was abandoned when Lake McKenzie filled at a higher elevation. When the lake drained, the floodplain was re-occupied and the river returned to approximately the original Hensler surface. The Hensler Terrace is mapped in two locations within the KNRI, in the areas of highest elevation in the southern and northern parts of the KNRI, on the right and left banks of the Knife River, respectively.

The *Stanton Terrace* is named after the village of Stanton located on this surface. The Stanton Terrace is located between elevations of 517 and 524 m, between 8 and 15 m above river level. Tributary stream terraces grading into the Stanton Terrace are mapped contiguous with the Stanton Terrace, but commonly have steeper slopes and extend to higher elevation. The Stanton Terrace along the Knife and Missouri rivers is characteristically flat to gently undulating, with slopes less than 5 degrees toward the river. The Stanton Terrace is a fill terrace generally composed of over 2 m of poorly sorted, flat-bedded to unbedded sand and gravel. The terrace fill is capped by up to 5 m of eolian silt or sand which grades into overbank silt and clay near tributaries. Upstream along the Knife River the Stanton Terrace is completely overlain by younger alluvium, and in those areas it is difficult to differentiate between the Stanton Terrace and the younger A Terrace. The Stanton Terrace is the lowest and youngest Pleistocene terrace identified and is probably Late Wisconsinan in age. This terrace occurs adjacent to and lower than the Hensler Terrace in the northern and southern parts of the KNRI on either side of the Knife River (Figure 22.1).

The *A Terrace* is the highest and oldest of the three Holocene terraces identified in the study area. It is found between elevations of 515 and 522 m, between 6 and 8 m above river level. The A Terrace is generally a fill terrace which can be divided into two major units. The lower unit contains light brown to gray, fine- to medium-grained silty sand and clay, up to 5 m or more in thickness, which coarsens downward. This is largely lateral accretion sediment deposited in channel margins as point bars. The upper A sediment consists of pale brown clayey silt containing several layers of dark grayish brown silty clay, capped by up to a meter of grayish brown silt. This unit contains charcoal, terrestrial gastropods, carbonate nodules, bones of large animals, and artifacts. This upper sediment is largely vertical accretion deposits accumulated as fallout from overbank flood waters. Silt capping this fill is loess, possibly reworked by slopewash and flooding. The dark colored bands are interpreted as paleosols.

Radiocarbon dates from several cutbank exposures of the A Terrace fill in the KNRI aid in determining the chronology of this terrace (see Table 8.1; also refer to the extensive discussion in Reiten 1983:85-109). The lower unit of the A Terrace is hypothesized to have formed in the period circa 8,500 to 4,500 years BP. The bulk of the upper unit of the A Terrace is thought to have formed during the period 4,500 to 2,500 BP, after which time deposition on the A Terrace surface became very slow and intermittent. Therefore the entire A Terrace fill has the potential for containing archeological deposits. This potential is thought to be much greater in the upper fill sediments which reflect a lower energy depositional environment and ground surfaces which were stable over much longer periods of time. This pattern is borne out by the lack of archeological materials documented to date in the lower A Terrace fill compared to at least two and perhaps more buried cultural horizons which have been documented in the upper A Terrace fill (see Chapter 23).

The lower fill unit in the A Terrace is interpreted to reflect high stream sediment load and high aggradation rates resulting from deteriorated climatic conditions and increased hillslope erosion during the mid-Holocene period, 8,500-4,500 BP. This corresponds to the Middle Holocene unstable episode referred to by Bickley (1972:127) which correlates with the accumulation of loess in the Pick City Member of the Oahe Formation on the surfaces of higher terraces along the Knife and Missouri rivers (Clayton et al. 1976:12). The upper A Terrace fill is interpreted to reflect a change to climatic conditions more like the present, with increased local vegetation cover, decreased hillslope erosion, decreased stream sediment loads, and decreasing aggradation rates. Sometime after about 2,500 BP, hillslope erosional conditions became even more stable and a period of river entrenchment began, with the floodplain being abandoned and with the A Terrace being formed above a new, lower floodplain.

The A Terrace can be differentiated from other terraces by its elevation limits, escarpments between higher and lower terraces, lack of meander scars on the surface, and the characteristic stratigraphy consisting of the upper and lower units just described. The A Terrace is restricted to the Knife River valley, although material similar to the upper A sediment underlies the Stanton Terrace or the loess capping the Stanton Terrace along the Missouri River, particularly near tributaries. The absence of the A Terrace along the Missouri River may be the result of its complete destruction by the meandering stream. Also, basic differences in runoff into the two river systems (with the Missouri deriving runoff from Rocky Mountain snowmelt sources) may have caused the formation of the A Terrace in the Knife River valley but not in the Missouri Valley.

The *B Terrace* is a composite of two fill terraces located from 0 to 6 m above river level and at elevations ranging between 509 and 520 m. The *B1 Terrace* ranges from 4 to 6 m above river level, and the *B2 Terrace* ranges up to 5 m above river level and includes the modern floodplain. The B Terrace is found along both the Knife and Missouri rivers, and it has an extensive exposure within the KNRI, particularly in lands east of the Knife River (Figure 22.1). Sand dunes, meander scars, and partially filled channel scars occur on the B Terrace surface. The meander scars are particularly characteristic of this terrace and are highly visible from the air.

The B1 Terrace fill unconformably overlies either lower A or upper A Terrace fill. The B1 deposit is characterized by a light brown to pale brown silty clay unit from 1 to 5 m thick which overlies a dark gray silty clay lower unit from 1 to 7 m thick. The lower unit contains carbonate nodules, bones of large animals, organic material, and terrestrial gastropods. It is interpreted as overbank alluvium. The upper fill unit is diffusely bedded and is interpreted to consist of lateral accretion deposits.

Radiocarbon dates (Table 8.1) indicate that the B1 Terrace is Late Holocene in age and was formed sometime during the period 2,500 to 340 radiocarbon years BP (refer to a more extensive discussion of chronology in Reiten 1983:85-109). Filling and aggradation of the B1 Terrace are thought to reflect an episode of relatively unstable hillslope vegetation conditions, with increased sediment loads in the rivers. This episode is bounded by periods of greater hillslope stability prior to the filling of the B1 Terrace, when downcutting from the A Terrace occurred, and after the filling of the B1 Terrace, when downcutting from the B1 surface occurred prior to formation of the B2 Terrace fill. This cycle of stable/unstable/stable erosional conditions can probably be correlated with accumulations of darker/lighter/darker colored windblown sediments in the Riverdale Member of the Oahe Formation as it occurs on higher terrace surfaces in the study area.

The B1 Terrace fill is inset into either the A Terrace fill or the B2 Terrace fill. The lower fill of the B2 Terrace consists of pale to very light brown silty sand containing terrestrial and aquatic gastropods, bivalve shells, large animal bones, wood, charcoal, and carbonate nodules. This fill is thought to be a lateral accretion deposit. The upper fill of the B2 Terrace consists of dark grayish brown silty clay with a few thin layers of lighter silty clay. This unit is largely overbank deposits.

The B2 Terrace fill is Late Holocene to recent in age. Radiocarbon dates (Table 8.1) indicate that this terrace has formed from about 340 radiocarbon years BP to the present.

GEOCHRONOLOGIC INTERPRETATIONS RELEVANT TO CULTURAL RESOURCES

Archeologists studying the history of man in the KNRI area have several questions which can be assessed by investigating geologic data from within the KNRI and from a larger surrounding area. Some of these questions include: 1) What climatic changes have occurred since the last Late Wisconsinan glaciers retreated? 2) What was the relationship between the rivers and the villages when the villages were occupied? and 3) Where are the best locations to expect to find different classes of cultural material in the KNRI?

Late Pleistocene and Holocene climatic change has been discussed in previous sections concerning the various members of the Oahe Formation windblown silt deposits which occur within the KNRI and in surrounding areas and in sections describing the various A, B1, and B2 Terraces within the KNRI and the environmental circumstances contributing to their formation. More lengthy discussions of this subject can be found in Clayton et al. (1976:8-13) and in Reiten (1983:110-119) based on various studies focusing on paleoecology, sedimentology, and geomorphology. More radiocarbon dates are needed to better define the timing and duration of specific climatic episodes. Some of that information will be forthcoming from integration of data from recent and ongoing studies conducted by UND in western North Dakota (e.g., Toom and Gregg 1983; Kay and VanNest 1984).

The relationship between village locations and the former positions of the Knife and Missouri river channels cannot be precisely defined based on available geologic data. The system of scroll bars east of the KNRI boundary has, in general, prograded towards the east. Therefore, the three major villages, Sakakawea, Big Hidatsa, and Lower Hidatsa, were probably closer to the Missouri River at the time of their occupation than they are now. The large expanse of the A Terrace which began to be deposited more than 4,500 years ago and which lies east of Lower Hidatsa Village (Figure 22.1) means that this village was never directly on the bank of either the Knife River or the Missouri River, contrary to previous interpretations by archeologists (Will and Hecker 1944:114; see also Clayton 1976). Even so, the relative positions of Lower Hidatsa Village on the Stanton Terrace and Sakakawea Village on the A Terrace may indicate that seasonal flood conditions along the Knife and Missouri were considerably different at the times that the two villages were established. Specifically, we can speculate that at least occasional flooding of the A Terrace occurred at the time that Lower Hidatsa Village was first settled (perhaps AD 1400), leading to its placement on the more elevated Stanton Terrace surface. When Sakakawea Village was established late in the 1700s, flooding of the less elevated A Terrace was presumably no longer a problem.

The location of three trails visible on aerial photographs and mapped in in the north-central part of Figure 22.2 appears to link Big Hidatsa Village with former Missouri River channels. They extend southeast from Big Hidatsa Village and end abruptly at obvious scroll bars. One ends at a contact between units 5 and 6, and two others end at a contact between units 4 and 5. It seems reasonable to assume that the scroll bars mark the edge of former river channels, and that the shorter trails are somewhat older than the longer trails.

Additional information on the relationship between the river and village locations can be found in contemporary observations and maps made at the time of late village occupations. These data are generally consistent with the geologic data. A variety of sources confirm that around AD 1800 the Sakakawea Village was very near the mouth of the Knife, that Amahami Village was directly on the Missouri about a mile downstream, and that the Missouri River lay about a mile or so east of the Big Hidatsa Village (cf. Wood 1977, 1986).

Specific depositional environments can be evaluated as possible locations of cultural activities and probable areas for preserving cultural remains. In the KNRI, sedimentary deposits most likely to contain cultural materials are included in the Oahe Formation. These units are mapped in Reiten (1983:Plate 2) as lithostratigraphic units 5 (windblown silt), 6 (windblown sand), and 7 (alluvium and colluvium).

In alluvial deposits, lateral accretion (point bar) deposits are unlikely locations for either cultural activities or preservation of cultural remains. Active point bars are generally flooded every year. Therefore, they are unlikely locations for other than temporary cultural activities. Any cultural materials found in point bar deposits are likely to have been reworked and to be out of stratigraphic context. An example of reworked artifacts in presently active point bar deposits occurs at the SGB site (32ME472) and possibly at the Hadu Duupa site (32ME468) on the east shore of the Knife River, directly across and downstream from Sakakawea Village (Lovick and Ahler 1982:247, 248).

Vertical accretion (overbank) deposits are more likely to contain cultural resources than lateral accretion deposits. These deposits are generally higher and subject to less intense flooding and are commonly locations of

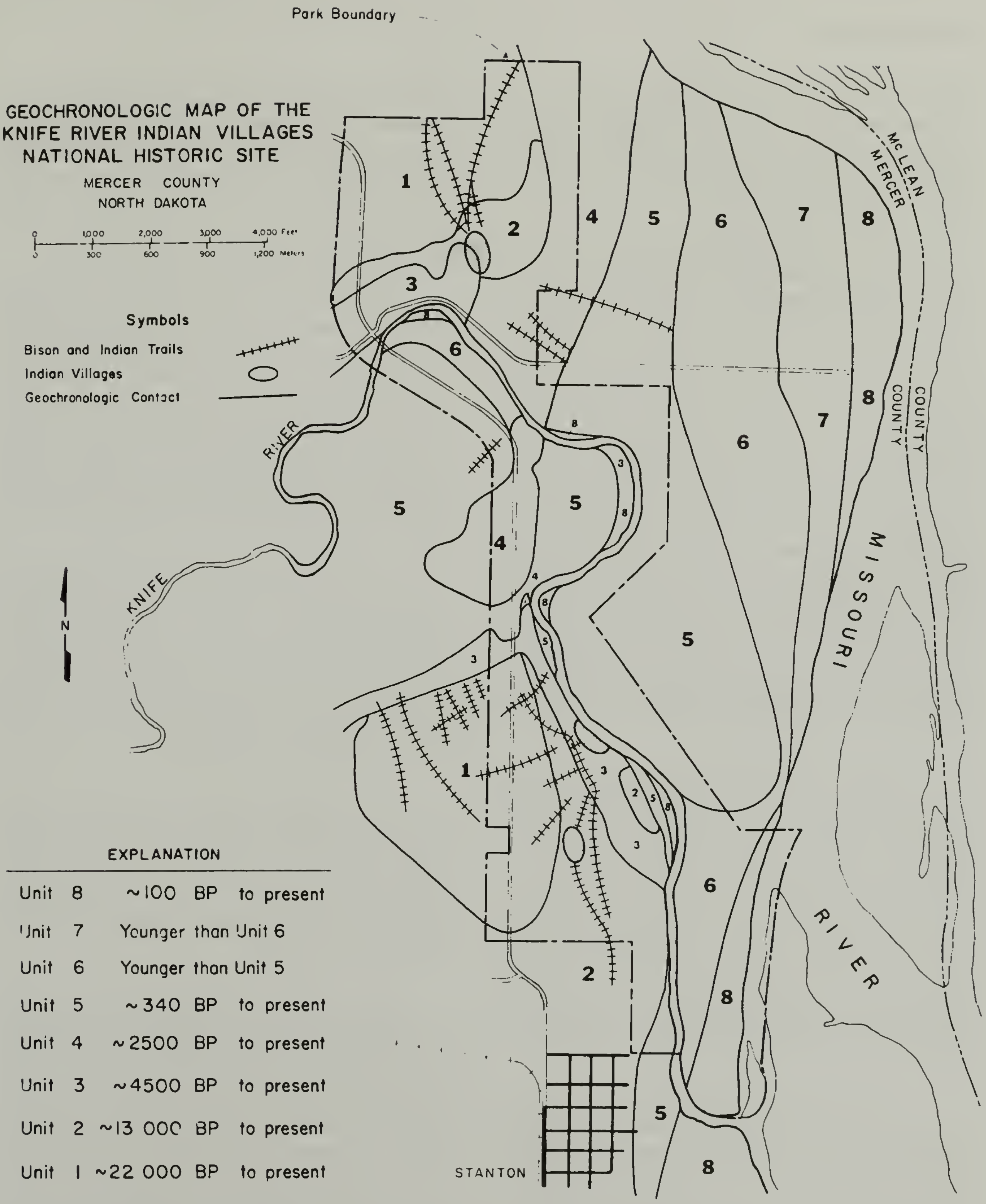
GEOCHRONOLOGIC MAP OF THE KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE
MERCER COUNTY
NORTH DAKOTA
0 1,000 2,000 3,000 4,000 Feet
0 300 600 900 1,200 Meters
Park Boundary
Symbols
Bison and Indian Trails
Indian Villages
Geochronologic Contact
N
KNIFE RIVER
MISSOURI RIVER
McLEAN
MERCER
COUNTY
COUNTY
STANTON
1
2
3
4
5
6
7
8
EXPLANATION
Unit 8 ~100 BP to present
Unit 7 Younger than Unit 6
Unit 6 Younger than Unit 5
Unit 5 ~340 BP to present
Unit 4 ~2500 BP to present
Unit 3 ~4500 BP to present
Unit 2 ~13 000 BP to present
Unit 1 ~22 000 BP to present

Figure 22.2. Geochronologic map showing maximum ages of cultural materials which could possibly be expected to occur upon or beneath the surface within various parts of the KNRI and surrounding areas.

more permanent cultural activities than point bars. Cultural materials could be located throughout overbank deposits, but concentrations are more likely to be within paleosols or humic horizons reflecting surfaces which were stable for longer periods of time.

Deposits of windblown silt are likely locations for cultural activities and preservation of artifacts. These deposits are generally on flat areas on higher terraces above the seasonal inundation level of the rivers, in locations which would be desirable for permanent occupation. Windblown deposits adjacent to a scarp dropping to a lower terrace or to a former river channel are highly likely locations for existence of buried cultural horizons. Although artifacts could be located throughout loess deposits, paleosols are the most likely stratigraphic horizons where cultural materials would be found. Windblown silt deposits are not commonly subject to intense reworking. Some mixing of sediments can be caused by rodents, but cultural materials deposited in loess are generally in place. Such cultural deposits have been discovered in the KNRI at the Scovill site (32ME409) which lies on a remnant of the Stanton Terrace surrounded by A Terrace and B Terrace sediments (Ahler and Mehrer 1984:162-191). Similar horizons probably exist at the Hump site (32ME414) and at other locations within the KNRI.

Artifacts are commonly associated with windblown sand deposits. This is true of the active dune field about 3 km southwest of the KNRI (sites 32ME346 and 32ME347). Unfortunately, preservation of original stratigraphy is often poor, with concentrations of cultural artifacts frequently found in deflated areas or blowouts. Paleosols in windblown sand are likely locations of in-place artifacts. Windblown sand deposits apparently occur in a broad area within the Lower Hidatsa West site (32ME499); several deep test excavations in those deposits yielded a few scattered artifacts but failed to reveal definable buried cultural components (Toom et al. 1985).

The windblown and alluvial deposits often form a thin veneer overlying much older sediment. In such cases the older material has generally been mapped as the surface sediment and the thin layer of alluvium or windblown sediment is ignored. In these settings the Holocene stratigraphy is compressed and stratigraphic markers such as paleosols have either coalesced, are indistinguishable, or one or more of the units have been removed by erosion. Therefore, if the surficial geology in this area is mapped as pre-Holocene (lithostratigraphic units 2, 3, and 4 in Reiten 1983:Plate 2), there can be up to one meter of Holocene sediment on the surface (that is, on all Hensler and Stanton Terrace surfaces mapped in Figure 22.1). Although stratigraphy within these thin deposits is often indiscernable, cultural materials of pre-Holocene to recent age are possible within or on these sediments.

Figure 22.2 is a geochronologic map of the KNRI and the immediate surroundings. This map is divided into eight geochronologic units. These units are differentiated by the estimated age of the near-surface sediments based on geomorphologic, radiometric, and sedimentologic information. On geologic grounds, it is possible for cultural materials up to the ages indicated to occur upon or within the sediments in each designated unit (although other considerations would suggest the maximum age of any artifacts in the KNRI to be about 11,500 years).

Unit 1 refers to the Hensler Terrace deposits and sediment of the Oahe Formation that overlies the fluvial sand and gravel deposits. Where a complete stratigraphic section of windblown silt of the Oahe Formation is present, the Mallard Island Member is the basal unit directly overlying the terrace sand and gravel. Unit 1 has the potential for containing archeological deposits ranging in age from 22,000 BP to the present.

Unit 2 (Figure 22.2) contains Stanton Terrace deposits and the Oahe Formation sand and silt overlying the terrace sand and gravel fill. The oldest member of the Oahe Formation likely to overlie these terrace deposits is the Aggie Brown Member. Unit 2 has the potential for containing archeological deposits ranging in age from 13,000 years to the present.

Unit 3 (Figure 22.2) contains overbank alluvial and eolian deposits of the Oahe Formation ranging in age from about 4,500 BP to the present. This includes sediment forming the upper part of the A Terrace. The maximum age of this unit is based on radiocarbon dates in the upper A Terrace deposits which range from about 3,900 to 3,000 radiocarbon years BP. The lower part of the A Terrace, also incorporated with map unit 3 in Figure 22.2, is undated, but possibly contains sediments as old as 8,500 years BP. It is possible that artifacts of that age may occur in the lower part of this unit, although it is unlikely due to the source of these sediments as lateral accretion deposits, as discussed in previous paragraphs.

Unit 4 refers to alluvial and eolian sediment making up the B1 Terrace. The age of this unit ranges from 2,500 BP to present, based on the interpretation that the erosional surface between the A and the B1 alluvial fills had formed by 2,500 BP.

Unit 5 refers to alluvial and eolian fill making up the upper part of the B2 Terrace. This includes sediment deposited after 340 radiocarbon years BP based on a C-14 date just above the erosional contact between the B1 and B2 alluvial fills.

Units mapped as 6 and 7 (Figure 22.2) are differentiated from other units strictly on the basis of geomorphology. Therefore, only relative maximum age can be given for these units. The separation of these units is based on the presence of distinct scroll bars visible on aerial photographs and small terrace steps visible on the ground. Unit 8 includes accretion land that was part of the original river channel when the original land survey was conducted in AD 1881. Therefore, unit 8 contains sediment no older than about 100 years.

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CHAPTER 23

PRE-VILLAGE PERIOD ARCHEOLOGY IN THE KNRI

Stanley A. Ahler

INTRODUCTION

While the KNRI archeological program has clearly been focused on the prominent Plains Village period cultural manifestations in the area, it has also revealed evidence of occupation and use of the area by peoples belonging to cultures much older than those in the Plains Village period. Collectively, we refer to these as pre-Plains Village or pre-Village manifestations, implying that they are at least 1,000 years and up to several thousand years in age. Together, pre-Village period remains in the KNRI can be assigned to what are presently termed the Paleoindian period (circa 11,500-8,000 BP), the Archaic period (circa 8,000-2,000 BP), or the Woodland period (circa 2,000-1,000 BP) (Lovick and Ahler 1982:51-54).

As a whole, pre-Village period archeology for the upper Knife-Heart region and for all of the Missouri River valley in North Dakota is extremely poorly known. This is particularly true for both the Paleoindian period and the Archaic period, but less true for the Woodland period.

Regarding the Paleoindian period, it is probably reasonable to assume that cultural complexes and manifestations ranging from the early Clovis complex through the Cody complex and other late lanceolate point complexes as described by Frison (1978:85-141) can be expected to occur within the upper Knife-Heart region. Gregg and Davidson (1983:135-168) document that artifacts from some of these complexes have in fact been found, primarily in surface contexts, at several locations in western North Dakota and surrounding areas, but that such finds are extremely rare within the Missouri valley. Components of this age are being found with increasing frequency in stratified windblown sediments near the Knife River flint quarries in Dunn County, some 50-70 miles west of our study area (Kay and VanNest 1984). Based on this it is reasonable to expect similar artifacts to occur within the Missouri valley at some of the numerous exposures of the Aggie Brown Member of the Oahe Formation (Clayton et al. 1976).

Regarding the Archaic period (circa 8,000-2,000 BP), present knowledge of the specific cultural complexes present in the Missouri valley and the upper Knife-Heart region is also extremely limited. This is not to say that evidence of Archaic period sites is lacking, however. Despite the fact that Gregg and Davidson (1983:133) in their compendium of "known or anticipated" Archaic complexes show extremely few classified Archaic period components within the Missouri valley, existence of such sites in the valley is actually relatively common. This is illustrated by a gradually growing body of data on sites of this age which derives from salvage excavations and shoreline surveys along the length of the Missouri valley in the Dakotas (e.g., Neuman 1964; Ahler 1989; Ahler et al. 1974; Ahler et al. 1977; Weston et al. 1979; Larson et al. 1983; Toom and Gregg 1983). It is apparent that except perhaps for Early Archaic period Logan Creek complex manifestations (cf. Kivett 1962), most of the Archaic period components in the Missouri valley cannot easily be fitted into existing Northwestern Plains cultural taxonomies or other taxonomies on the basis of projectile point typology. Eventually, the Missouri valley or at least subparts of it will require an independent system for cultural taxonomy for the Archaic period. The presence of Archaic period components in the valley will be apparent from the review of data from the KNRI and surrounding areas in the subsequent sections.

Knowledge of Woodland period (circa 2,000-1,000 BP) manifestations in the immediate study area is relatively more advanced than that for earlier cultural periods. One of the better known manifestations in the region and adjacent areas is the Sonota complex (Neuman 1975), presently dated at circa 2,000-1,400 BP. The Sonota complex is here assigned to the Early/Middle part of the Woodland period, and is known from both settlements and burial mounds along the Missouri trench in both Dakotas. The Sonota complex is identifiable as a regional variant of the much more widespread Besant complex (Reeves 1970; Wettlauffer 1955; Gregg and Davidson 1983:199-210) defined on the basis of distribution of Besant-type dart points. Components containing Besant dart points and classifiable as part of the Sonota/Besant complex, or at least assignable to the Early/Middle Woodland period (herein circa 2,000-1,500 BP) are relatively common in the study region (cf. Wood and Johnson

1973; Weston et al. 1980; Ahler, Goulding, and Weston 1979; Ahler et al. 1981; Ahler et al. 1982). Indications are that such components are more concentrated in the breaks physiographic zone within the valley, and many of the sites reflect an emphasis on bison procurement in and near those settings.

Recent investigations on the Cross Ranch within the upper Knife-Heart region have allowed the definition of Late Woodland period cultural components thought to date in the period 1,500- 1,000 BP (Ahler et al. 1981; Ahler et al. 1982). Like the earlier Woodland period Besant components, these sites are heavily concentrated in the breaks physiographic zone and seem to be linked to a focus on procurement and processing of bison in draws and nearby areas. Linear mound complexes occur throughout the region (Chomko and Wood 1973) but it is presently unclear if these mounds are more properly associated with the Early/Middle Woodland period or with the Late Woodland period, because the mounds are often in proximity to occupation sites dating to both periods. Late Woodland sites are recognized primarily by the presence of cord-roughened pottery (Ahler et al. 1982:241-247) in association with side- to corner-notched arrowpoints. Most of the arrowpoints are visually indistinguishable from points used by later Plains Village peoples, but statistical studies of arrowpoint measurements (Ahler et al. 1982:247-258) indicate that, as a group, the Late Woodland period artifacts can be distinguished from Village period specimens.

With these considerations in mind, we can proceed to a discussion of present evidence for pre-Plains Village period archeological components in the KNRI and in the immediately surrounding area. Three kinds of data are taken to be particularly indicative of the presence of archeological remains from this period. One is the presence of chronologically diagnostic artifacts. This includes cord-roughened pottery indicative of Woodland period sites (circa 2,000-1,000 BP), and dart-sized projectile points used with atlatl or hand driven projectiles rather than with the bow and arrow, which can be indicative of Paleoindian through Early/Middle Woodland period sites (circa 11,500-1,500 BP).

The second type of data consists of the presence of moderately to heavily patinated chipped stone artifacts (tools or flaking debris) made of Knife River flint (KRF) (definitions of varying degrees of patination in KRF artifacts are given in Ahler and Christensen 1983:199-200). Use of this criterion for the identification of pre-Village age components is based on the observation made from study of many collections throughout the region that KRF arrowpoints which can be assigned with confidence to either the Plains Village period or the Late Woodland period (all 1,500 years in age or less) rarely exhibit patination more pronounced than "light" in intensity (cf. Ahler et al. 1982:259- 260; Ahler and Swenson 1985:150; Clark 1985:82-84). Exceptions to this pattern are extremely few, and in some of those cases, the moderately to heavily patinated "arrowpoints" have been determined by wear pattern analysis to actually be small cutting tools which could conceivably be made by people in any time period or cultural tradition (Kay et al. 1984:82). Based on this observation concerning temporally and technologically diagnostic artifacts, we assume that any KRF artifacts which exhibit moderate to pronounced or heavy intensity patination constitute direct evidence of age greater than 1,500 years, and are by definition pre-Village period in origin. The reverse of this argument is not necessarily true; i.e., all artifacts lacking moderate to pronounced patination are are not by definition less than 1,500 years in age. Circumstances which cause patination, even in old artifacts, are selective, and many artifacts greater than 1,500 years in age will show no patination, depending upon their depositional and environmental contexts (cf. VanNest 1985).

A third type of data is stratigraphy; in some cases cultural deposits are found in deeply stratified contexts well below recognized Village period components. In such cases, the deeper cultural horizon is assumed to be pre-Plains Village period in age.

PRE-PLAINS VILLAGE PERIOD EVIDENCE FROM THE KNRI

Evidence of possible pre-Plains Village components exists at 20 of the 56 sites recorded within the KNRI. A list of these sites is provided in Table 23.1, along with the basis for such determinations. The nature of the evidence makes the presence of pre-Village components somewhat more certain at perhaps 17 of the 20 sites (shown in Fig. 4.2), and somewhat less certain at at least three of the sites designated by a (?) in Table 23.1. Potentially diagnostic artifacts from several of these sites are illustrated in Figures 23.1 and 23.2. A brief discussion of evidence for each site will be provided; additional data are usually available for each site in the referenced reports on test excavation and surface collections.

Buchfink, 32ME9

Pre-Village period evidence from the Buchfink site occurs in the form of small numbers of moderately and heavily patinated flakes recovered in excavation and documented on the site surface (Lovick and Ahler 1982:Table 15, p. 223). One heavily patinated retouched flake tool occurs in the excavated sample (Ahler and Mehrer 1984:126), and patinated tools are more common in lower excavation levels. Even so, a stratigraphically definable pre-Village period horizon is not identifiable in the relatively shallow excavations at the site. Diagnostic artifacts from the surface include a segment of a possible dart point (Lovick and Ahler 1982:Figure 16i) and a full-grooved axe (Figure 23.1a). The raised ridges around the groove on the axe are a feature occurring on grooved axes found in certain Plains Village sites (cf. Lehmer 1971:Figure 80), but the axe is less well made than most Village forms and it probably is associated with an Archaic period component at the site. Portions of the site have been heavily disturbed by gravel mining and cultivation, and such disturbances may have brought early artifacts to the surface from deeper components not penetrated in test excavations.

Lower Hidatsa Village, 32ME10

Evidence for pre-Village components at Lower Hidatsa Village comes from excavated patinated stone tools and from diagnostic projectile points. The excavated collection contains five projectile points which based on size and technology are determined to be dart points predating the main Plains Village components at the site (e.g., Figure 23.1b, c). None of these can be classified according to previously defined types. In addition, the excavated samples also contain a total of 22 KRF stone tools which exhibit some degree of patination, with six of these being heavily patinated (Ahler and Weston 1981:112, 124). Less than 1 percent of the KRF flaking debris from excavation exhibits some degree of patination, although a detailed quantification by intensity of patination has not been conducted (Ahler and Weston 1981:Appendix A). The patinated stone tools and diagnostic, pre-Village period projectile points do not occur in any particular stratigraphic horizon in the site excavations, but appear to be mixed rather randomly among the Plains Village age midden deposits. This suggests that some of these artifacts are scavenged items reused by the villagers. Unpatinated edge retouch indicates such to be the case for at least two tools (Ahler and Weston 1981:124). Other patinated artifacts are likely to be tools from actual pre-Village components beneath the village which were disturbed by later Village period digging of borrow and cache pits.

Sakakawea Village, 32ME11

Preceramic period artifacts from Sakakawea Village consist of at least two heavily patinated bifaces and three projectile points having morphologies indicative of pre-Plains Village time periods (Figure 23.1e, f, g). Patination intensity was not documented in detail in stone tools or in flaking debris described in the test excavation report (Ahler et al. 1980). A more detailed examination of lithic technology conducted by Goulding (1980:119-120) led to the conclusion that the manufacture of chipped stone tools was a relatively diminished activity for the post-contact Plains Village peoples living at the site, and that scavenging of existing artifacts may have supplied some of the villagers' needs for stone tools. In addition, a very intensive examination of nearly the entire length of the cutbank exposure in the A Terrace along the Knife River and through the site failed to reveal the occurrence of any artifacts in a stratigraphic context beneath the main village component (Ahler et al. 1980:197). These facts together suggest strongly that many if not all of the apparent pre-Village age artifacts found at Sakakawea Village found their way into the site by the process of reuse and scavenging by the later village peoples, and that no in situ pre-Village age component actually exists there. Such recycling behavior is a relatively common occurrence in the post-contact age stone tool samples from Big Hidatsa Village, where a more detailed study of stone tools has been made (Ahler and Swenson 1985:184).

Big Hidatsa Village, 32ME12

At Big Hidatsa Village evidence of pre-Village artifacts occurs both in the form of heavily patinated items which were recycled and reused by the later villagers as well as in the form of artifacts from deep, stratified contexts within one part of the site. Most interesting perhaps, is a broken, heavily patinated 7,000-8,000 year old large side-notched dart point (a Simonsen point; Agogino and Frankforter 1960) which was retouched and reused by the villagers as a cutting tool (Figure 23.1d). Forty-two other patinated artifacts occur at the site which appear to have been recycled and reused by the village populations. Only five patinated stone tools lacking evidence of reuse occur in the excavated sample of 2,200 classifiable tools, and only one of these is more than lightly patinated (Ahler and Swenson 1985:145). Thus it appears that, as at Sakakawea Village, patination in stone tools indicates the reuse of existing scavenged artifacts by the villagers rather than existence of an in situ pre-Village component somewhere within the site.

The second form of evidence for a pre-Village period component comes in the form of a small sample of flaking debris, stone tools, and other artifacts from a stratified context lying well beneath the main village

Table 23.1. Summary of evidence for pre-Plains Village period components at archeological sites within the KNRI.

	Surface Artifacts		Excavated Artifacts		
Site	Mod/Heavy Patina	Diag-nostics	Mod/Heavy Patina	Diag-nostics	Stratigraphy
32ME9 Buchfink	X	X	X	-	-
32ME10 Lower Hidatsa	-	-	X	X	-
32ME11 Sakakawea (?)	-	-	X	X	-
32ME12 Big Hidatsa	-	-	X	X	X
32ME310 Bihohka	X	-	-	-	-
32ME366 Taylor Bluff	-	-	-	-	X
32ME407 Poly	X	-	X	-	X
32ME408 Elbee	X	X	X	X	X
32ME409 Scovill	X	-	X	X	X
32ME411 Lobodi (?)	-	?	-	-	-
32ME412 Hotrok	X	X	-	-	-
32ME413 Forkorner (?)	-	-	X	-	-
32ME414 Hump	X	X	X	-	-
32ME415 Youess	X	-	X	-	-
32ME473 NaxpikE	X	-	X	-	-
32ME474 Rokhohl	X	-	-	-	-
32ME493 Sakakawea Cemetery	X	X	-	-	-
32ME497 Selca	X	-	-	-	-
32ME498 Smaul	X	-	-	-	-
32ME499 Lower Hidatsa West	X	X	X	-	X

Note: X = data present; - = data absent; (?) = evidence is uncertain.

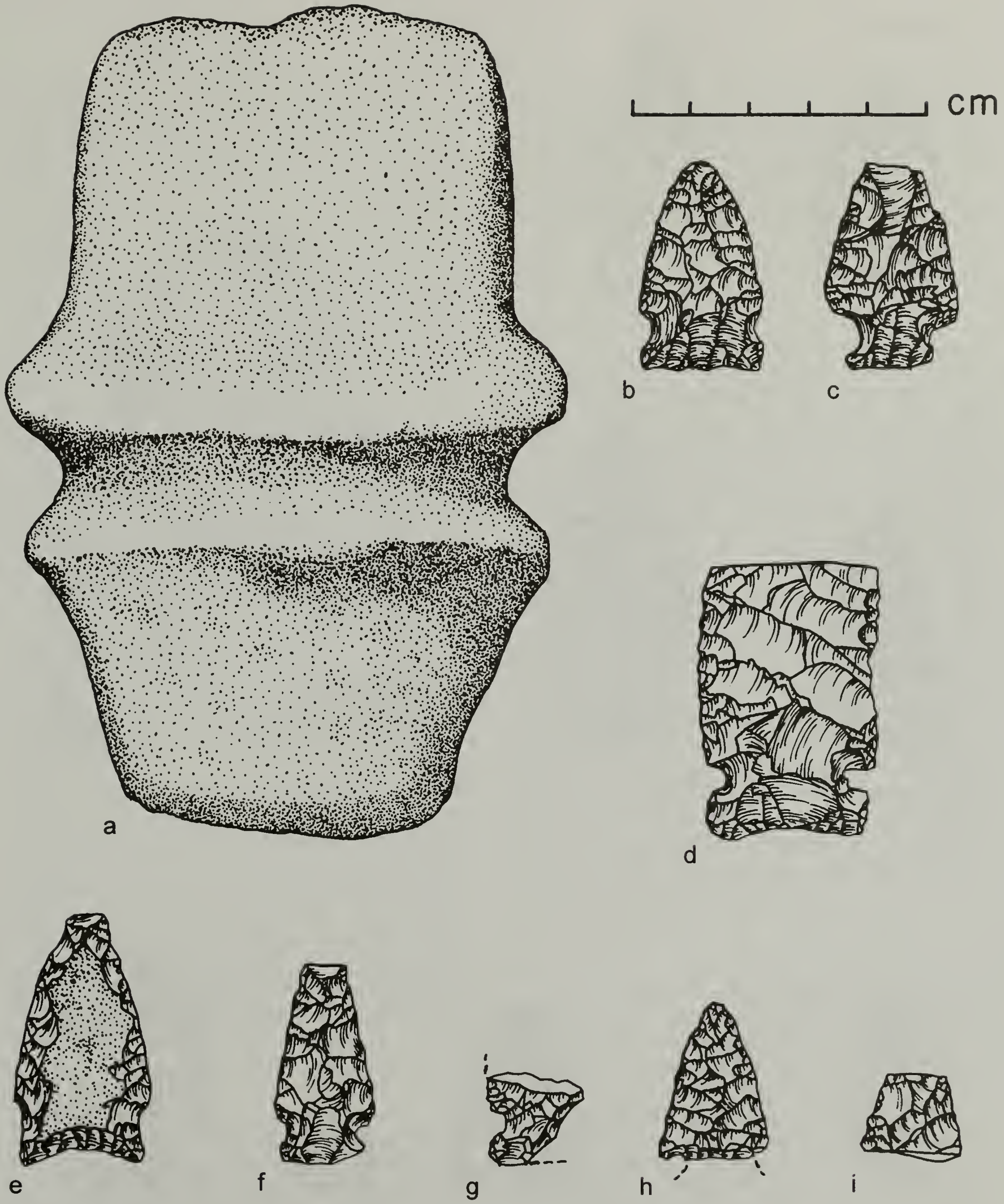

Figure 23.1. Pre-Plains Village period artifacts from sites within the KNRI. a: Buchfink, 32ME9; b,c: Lower Hidatsa Village, 32ME10; d: Big Hidatsa Village, 32ME12; e-g: Sakakawea Village, 32ME11; h,i: Elbee, 32ME408.

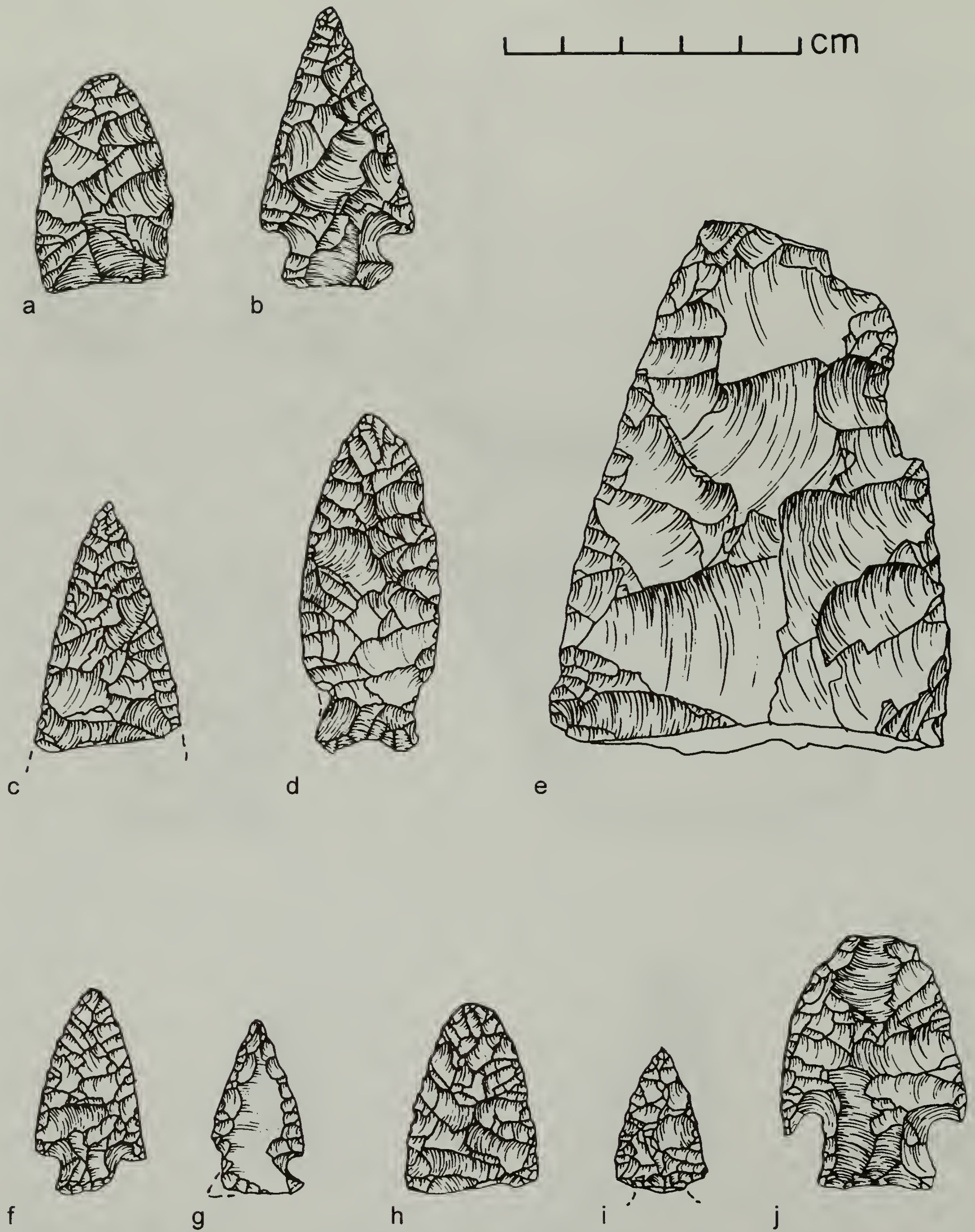

Figure 23.2. Pre-Plains Village period artifacts from sites within the KNRI. a,b: Scovill, 32ME409; c: Hump, 32ME414; d,f-i: Sakakawea Cemetery, 32ME493; e: Lobodi, 32ME411; j: Lower Hidatsa West, 32ME499.

midden horizon at the site. This material was recovered from a humic horizon or paleosol in the alluvial A Terrace sediments at a depth of circa 50-60 cm below the base of Plains Village age midden in the eastern part of the village (Ahler and Swenson 1985:60, 62). The artifact sample from that context consists of four fragments of non-diagnostic stone tools and more than 1,700 pieces of flaking debris, nearly all of which are KRF. None of the KRF artifacts from this context are patinated, owing perhaps to their rapid burial in an alluvial environment. Analysis of the flaking debris sample indicates that it reflects a selective concentration of refuse from late-stage percussion thinning and pressure flaking of large thin bifacial tools such as dart points and/or patterned cutting tools. The age of this component remains undetermined. Extrapolating from a radiocarbon date of 3,430 RCYBP on charcoal from a paleosol about 1.8 m below surface in the same A Terrace segment at the nearby Taylor Bluff cutbank (Table 8.1), it can be estimated that the buried cultural horizon in excavation Unit 9 at Big Hidatsa Village is between 1,500 and 3,000 years in age.

Bihohka, 32ME310

The majority of the artifacts from this site appear to be preceramic in age, based on the presence of heavy patination on nearly two-thirds of the patinable stone tools and flakes recovered from a controlled surface collection at the site (Lovick and Ahler 1982:Table 15). The site occurs on a small sandy knoll, which is probably a remnant of a Stanton Terrace surface possibly overlain by windblown Oahe Formation sediments which may contain the artifactual remains. A nearby cutbank exposure at the Knife River reveals the presence of what appears to be the Aggie Brown Member of the Oahe Formation in a buried context, but no apparent artifact-bearing horizon. No diagnostic pre-Village period artifacts have been collected from the site, and little can be said about the exact age or function of the pre-Village age component.

Taylor Bluff, 32ME366

Evidence for a pre-Plains Village period component at this site occurs in the form of scattered large animal bone fragments and charcoal occurring in a well-developed paleosol about 1.8 m below surface in the A Terrace in the cutbank along the Knife River through this site. Charcoal in this paleosol has been dated at 3,430 ± 70 RCYBP. Excavations into this paleosol near the cutbank recovered fragmented wapiti (elk) bones, a few flakes, but no diagnostic artifacts (Ahler 1988). Test excavations in another part of the site which apparently penetrated this same paleosol failed to yield evidence of a definite cultural component in this stratigraphic unit. The nature of this preceramic age component at Taylor Bluff remains enigmatic.

Poly, 32ME407

Evidence for pre-Plains Village period occupation at the Poly site exists in the form of moderate and heavily patinated stone tools and flaking debris in both surface collections and excavated collections. Some 3.8 percent of the flaking debris in a controlled surface collection from the site exhibits heavy patination (Lovick and Ahler 1982:Table 15). Slightly more than 3 percent of the excavated flaking debris sample from the site exhibits moderate to heavy patination, although the patinated items are not concentrated in any particular stratigraphic level within the site deposits (Ahler and Mehrer 1984:144). A single excavation unit at the Poly site penetrated the full extent of windblown sediments and reached the surface of the underlying gravel fill of the Stanton Terrace; no distinct buried cultural horizon was discovered in this excavation. All evidence suggests that one or more pre-Village period occupations have occurred at the Poly site, but that excavations did not penetrate areas where this activity was very intensive, and that the few pre-Village age artifacts encountered in excavation are highly mixed among the dominant Plains Village artifacts at the site. Nothing further can be concluded concerning the pre-Village age component(s) at the site.

Elbee, 32ME408

The Elbee site contains one of the best documented pre-Village period components in the KNRI. This component was first discovered as a localized scatter of heavily patinated KRF stone tools and flaking debris eroding from the scarp of the A Terrace. Minor test excavation revealed a distinct cultural horizon contained within a dark paleosol lying about one meter below the maximum elevation of the A Terrace surface (Ahler 1984a, 1984b). Artifacts in the cultural horizon include a possible prepared core, a chopper, a hide scraper, biface fragments, flake tools, flaking debris, a fragmentary dart point (Figure 23.1i) and small amounts of burned bone and fire-cracked rock. The projectile fragment cannot be classified typologically. A portion of a notched dart point was recovered in a disturbed plowzone context at the site (Figure 23.1h), and this item may have originated in the same natural horizon as the main pre-Village component. Virtually all of the KRF stone tools and flaking debris from the buried horizon at Elbee exhibit moderate to pronounced patination. The artifact sample is too small for detailed interpretation, other than to note a very high frequency of KRF in both tools and flaking debris and a relatively high frequency of large patterned bifaces in the sample. The sample cannot be dated directly, but based on a radiocarbon date of 2,970 ± 70 BP at a depth of 2.6 m in a nearby cutbank in the same terrace, it is estimated that the component dates in the period 2,000-3,000 BP and probably is representative of the Late Archaic period.

Scovill, 32ME409

Evidence of a pre-Village age component at the Scovill site was first observed in the form of a small number of heavily patinated tools and flakes in an intensive surface collection from the site (Lovick and Ahler 1982:Table 15). Such a component was confirmed in test excavations at the site (Ahler and Mehrer 1984:162-191). The excavated sample reveals a marked increase in heavily patinated flakes (23.5 percent) in the third excavation level below surface (30-45 cm surface depth) compared with a less than 4 percent occurrence in other horizons containing predominantly Plains Village period artifacts. A bank profiling operation documented the presence of the Aggie Brown, Pick City, and Riverdale Members of the Oahe Formation (Clayton et al. 1976) in about a meter of windblown sediment, establishing the potential context for cultural materials ranging in age from Paleoindian through recent. The profiling operation documented artifacts as deep as 95 cm in the cut through the site, with the lowest specimen estimated to be about 8,500 years in age. An unfinished, heavily patinated dart point was recovered from the profile at a depth of 52 cm surface depth (Figure 23.2a). Another unpatinated KRF dart point, presently unclassified (Figure 23.2b), was recovered from a Plains Village period feature. It apparently represents a specimen removed by the villagers, intentionally or inadvertently, from some earlier archeological context. Thus, while excavation to date has not investigated in detail the pre-Village components at the Scovill site, the presence of multiple components of considerable age in stratified windblown sediments has been well documented.

Lobodi, 32ME411

The Lobodi site is known only from a small surface artifact collection (Ahler, Weston, and Mehrer 1979:43-46). The artifacts are unusual, consisting in part of KRF bifaces, worked shell, and a human tooth, leading to the conclusion that the site represents a burial location. The KRF artifacts are not patinated, and the larger biface fragment is one of the largest KRF tools known from any KNRI site (Figure 23.2e). The question of the age of the artifacts remains. Pottery at the site consists of a single Knife River ware vessel, but this was found in a location separate from the other artifacts, indicating that the pottery and other items may not be contemporaneous. On the assumption that the bifaces found at the site reflect a special interest in KRF as a raw material, it is thought likely that the site is an Early/Middle Woodland period burial location. This is based on the fact that KRF was a preferred lithic raw material among peoples classified as part of the Early/Middle Woodland period Besant/Sonota complexes (Gregg and Davidson 1983:205) and that Sonota peoples are thought to have been instrumental in movement of the KRF artifacts far beyond the immediate source area (Clark 1984). The pre-Village period identification for the Lobodi site is, however, considered to be highly speculative.

Hotrok, 32ME412

Evidence for pre-Plains Village period use of the Hotrok site is in the form of a single, heavily patinated, notched dart point fragment found on the site surface (Ahler, Weston, and Mehrer 1979:46-47, Fig. 91). The point has not been classified. It is impact fractured and may have been lost at the site while in use. No other patinated artifacts or artifacts diagnostic of pre-Village activity were recovered at the site in test excavations (Ahler and Mehrer 1984:45-72). It is likely that pre-Village activity at this site was extremely brief and intermittent, perhaps consisting only of a single hunting incident reflected in the projectile point found on the surface.

Forkorner, 32ME413

The evidence for pre-Plains Village period use of the Forkorner site lies in a single heavily patinated stone tool found in excavation in the east site area (Ahler and Mehrer 1984:233) and a single heavily patinated piece of flaking debris found in an extensive surface collection

(Lovick and Ahler 1982:Table 15). Heavy patination is completely absent in excavated flaking debris. The few items of patinated KRF at this site could reflect a very ephemeral pre-Plains Village age component(s) or they may be indicative of reuse of earlier artifacts by the Plains Villagers. Lacking additional data from deeper excavations, a more definite statement concerning early components is not possible.

Hump, 32ME414

Evidence for pre-Plains Village period occupation(s) at the Hump site is quite clear. Intensive surface collections at the site have resulted in recovery of more than 70 pieces of heavily patinated KRF flaking debris and stone tools, and higher frequencies of less intensively patinated items (Lovick and Ahler 1982:Table 15). These items were recovered from a localized part of the site surface circa 50 m in diameter, within a much broader scatter of primarily Plains Village artifacts (Lovick and Ahler 1982:242). A special collection of heavily patinated items was made in the same area in 1981, and excavation in a nearby area was extended to the base of windblown sediments in an attempt to recover early artifacts in situ (Ahler and Mehrer 1984:252-269). Scattered heavily patinated flaking debris was recovered in excavations which penetrated the Riverdale, Pick City, and Aggie Brown Members of the Oahe Formation (Clayton et al. 1976), but no distinct pre-Village age cultural horizon was definable. Early surface artifacts include a fragment of an unclassified dart point (Figure 23.2c), bifacial cutting tools, hide scrapers, flake tools, and flaking debris. More specific statements on the age and function of the early component(s) cannot be made without further recovery of additional artifacts from undisturbed contexts.

Youess, 32ME415

Controlled surface collection within the Youess site resulted in the recovery of ten heavily patinated KRF stone tools and pieces of flaking debris (Lovick and Ahler 1982:Table 15). No heavily patinated stone tools or flakes were recovered in excavation, and excavated flaking debris samples contained 13 flakes with moderate patination in a sample of more than 900 (Ahler and Mehrer 1984:294, 298). Excavations did not explore for earlier cultural components beneath the existing plowzone, and the natural stratigraphy within the site is unknown but is probably similar to that exposed on the nearby Hump site on the same Stanton Terrace margin. The nature and age of pre-Village component(s) at this site remain decidedly unclear, although the frequency of moderately to heavily patinated artifacts in various collections makes the existence of such a component relatively certain.

NaxpikE, 32ME473

Evidence of pre-Plains Village period occupation(s) at the NaxpikE site is derived from a controlled surface collection in which about one-third of the flakes and stone tools exhibit heavy patination (Lovick and Ahler 1982:Table 15). The site also has at least one Plains Village component. Excavation has not occurred at the site. No diagnostic pre-Village age artifacts have been found, and little more can be said based on available data concerning the age and function of the early component(s) at that location.

Rokhohl, 32ME474

No systematic artifact collection or excavation has occurred at this site, located on the northern slope of the Hensler Terrace in the KNRI, and its pre-Plains Village content is defined on the basis of a few moderately to heavily patinated flakes observed in gravel mine exposures in the site. The site also contains bone debris and fire-cracked rock, but nothing further can be said at this time about its exact age and function.

Sakakawea Cemetery, 32ME493

This is a very large site found primarily on the Hensler Terrace surface and its slope to the lower Stanton Terrace in the southern part of the KNRI. It is best known for the extensive Plains Village burial areas contained within the site. A systematic surface reconnaissance of the area revealed a relatively high frequency of patinated flaking debris on the site surface, and five moderately to heavily patinated projectile points were collected from the surface (Figure 23.2d, f, g, h, i) (Lovick and Ahler 1982:261-263). One of these (Figure 23.2d) resembles a Duncan or Hanna point assigned by Frison (1978) to the Middle Plains Archaic period (circa 5,000-3,200 BP) in the Northwestern Plains. Such a classification is only tentative for the KNRI specimen. Another of these (Figure 23.2g) resembles an arrowpoint in size and morphology, but it may be a small hafted cutting tool made in the pre-Plains Village period, considering its heavy patination. The other points are unclassified small to medium-sized dart points or dart point fragments. Some of these artifacts may reflect losses during hunting activities in this part of the KNRI, while others may reflect other less ephemeral cultural behavior, particularly in light of the occurrence of a considerable amount of patinated flaking debris on the site surface. Lacking subsurface investigations or detailed data on spatial concentrations of patinated artifacts, little more can be stated at this time concerning pre-Plains Village period activities at the site.

Selca, 32ME497

This site, on the Hensler Terrace surface in the southern part of the KNRI, has been investigated only through intensive surface examination. No artifacts have been collected from the site (Lovick and Ahler 1982:266-267). About two-thirds of the flaking debris observed at the site in rodent burrow backdirt piles and other exposures exhibits some degree of patination, in some cases being heavy in intensity. This indicates that a pre-Plains Village component occurs there in addition to the Plains Village component(s) also evident in the observed surface artifacts.

Smaul, 32ME498

This site is on a small rise on the high Hensler Terrace surface in the southern part of the KNRI. It has been documented through surface examination and a selective surface collection (Lovick and Ahler 1982:267-268). Heavily patinated flaking debris and cores occur in the surface artifact sample, indicating the presence of pre-Plains Village period component(s) at that location along with other components. Additional data concerning early component(s) at the site cannot be presented in the absence of subsurface investigation.

Lower Hidatsa West, 32ME499

Evidence for pre-Plains Village period component(s) at the Lower Hidatsa West site occurs in the form of a single heavily patinated dart point (Figure 23.2j) found on the site surface and a small number of moderately to heavily patinated flakes from several site contexts. The projectile point, presently unclassified, was actually found in an area near but outside of the site boundary based on the density of primarily Plains Village artifactual debris (Ahler, Weston, and Mehrer 1979:43). Deep test excavations in an area south of the site and in the site proper (Toom et al. 1985) recovered very small numbers of moderately to heavily patinated KRF flakes from both plowzone and subplowzone contexts, but no definable subplowzone cultural horizons could be identified. The conclusion is that, like adjacent sites on the Hensler and Stanton Terrace surfaces, the Lower Hidatsa West site contains evidence of very ephemeral pre-Village period cultural activity, presently undated and of an uncertain functional nature.

PRE-PLAINS VILLAGE EVIDENCE FROM OUTSIDE THE KNRI

There is considerable evidence for the existence of many pre-Plains Village period sites and components in the area immediately surrounding the KNRI. Virtually all of this evidence exists only in the form of site forms filed with the State Historical Society of North Dakota in Bismarck and in the surface collections from those sites, presently curated at the University of North Dakota. Almost none of this information has been formally reported. Table 23.2 provides a summary of sites in the area which have produced definite evidence of pre-Village period cultural components in the form of diagnostic projectile points or artifacts exposed in situ within stratigraphically datable Oahe Formation sediments. Evidence for Woodland period components consists of either burial mounds or Besant projectile points (Johnson 1970). Late Archaic period components are identified by the presence of small- to medium-sized corner-notched dart points similar to those which are characteristic of Late Archaic period components at the Mondrian Tree site (Toom and Gregg 1983). Middle Archaic period components are identified by the presence of projectiles in the McKean/Hanna/Duncan point cluster (Mulloy 1954; Wheeler 1954). Early Archaic period components are identified by the presence of Simonsen side-notched points characteristic of the Logan Creek complex (Agogino and Frankforter 1960; Kivett 1962; Ahler and Toom 1989). Unidentified Archaic period forms consist of a wide variety of unclassifiable side-notched, corner-notched, and stemmed dart points which cannot readily be associated with a particular cultural period; some of these are similar to the unclassified dart point forms found on sites within the KNRI (Figures 23.1 and 23.2).

Table 23.2. Summary of diagnostic artifact occurrences or other chronological information at sites having pre-Plains Village period components in the area near but outside the KNRI.

Site	Woodland	Late Archaic	Middle Archaic	Early Archaic	Unid. Archaic	Stratigraphy
East of 32ME5, Deapolis		X	X	X		
32ME7, White Buffalo Robe		X				X
32ME104, Stanton Mound Group	X		?	?		X
32ML143			?	?		X
32ME299	X					
32ME300		X			X	
32ME301					X	
32ME304				X		
32ME306					X	

Note: X = indicates that a projectile point or information for that period is available;
? = occupation in this period is likely based on stratigraphic data.

One of the more extensive collections containing abundant evidence of preceramic period artifacts was made by Dave Jensen of Hazen, North Dakota, in the period 1964-1966 at a location just east of Deapolis Village (32ME5) on a high terrace of the Missouri River (probably in windblown silts capping the Stanton Terrace). This collection was made while this area was being graded down for construction of facilities attendant to the United Power Association power plant which now stands on the former Deapolis site location. Jensen reports the presence of several hearths as well as artifacts in the graded deposits. His collection, donated to UND in 1980, contains many projectile points, stone tools of various kinds, and modified bone. The projectile points exhibit a wide range of variation in patination intensity, with the Middle and Late Archaic specimens generally being lightly patinated, and with the Early Archaic specimens exhibiting moderate to pronounced patination. This area is now thought to be completely destroyed or buried beneath construction related to the power plant at that location.

A small collection of pre-Plains Village period lithic artifacts was recovered in excavation at the White Buffalo Robe site (Lovick 1980:310-323). This material, associated with flaking debris having varying degrees of patination, was widely dispersed within the site, but tended to be concentrated in certain spatial areas of the site, interspersed with later Plains Village period artifacts. Deep excavations did not occur there, although examination of the cutbank through the site revealed the presence of several stratified humic horizons in windblown silt, with many such zones apparently containing cultural deposits.

The Stanton Mound Group is a series of linear mounds and cut-sod features lying about 1 km north of the KNRI on the McKenzie Terrace surface. This site is described in Chomko and Wood (1973) and it is assumed to be attributable to the Woodland period. Unfortunately much of the mound area is actively being mined for gravel. Exposures in the gravel pits document a stratified windblown silt sequence encompassing the full Oahe Formation (Reiten 1983:Figure 17). Many heavily patinated artifacts have been found in the gravel spoil piles and in situ in the Pick City Member silt exposed there. Some of these gravel-mined collections are cataloged under site number 32ME304 (Table 23.2). There is little doubt that the site contains extensive cultural deposits spanning from Early Archaic through the Woodland period, but little more is known about the location.

Site 32ML143 lies directly across the Missouri River east of the KNRI. It consists of a dense concentration of KRF flaking debris and tools exposed at a depth of circa 2.85 m below surface in a cutbank along the Missouri. The exposure at the site includes the upper three members of the Oahe Formation overlying Stanton Terrace gravels and till (Reiten 1983:Figure 15), with the dense artifact-bearing horizon occurring in the Pick City Member less than a meter above the Aggie Brown Member. A sample of several thousand flakes and several broken bifaces, all patinated to varying degrees, was collected from the site. This material is interpreted to be the remains of a lithic knapping area, and fire-cracked rock indicates that other activities occurred at the site. The age of this component is probably Middle to Early Archaic (4,000-8,000 BP) based on its stratigraphic position within the Oahe formation.

In 1978 and 1979, John Taylor, then Park Archeologist at the KNRI, conducted pedestrian survey in several discontinuous land tracts, mostly on the Stanton Terrace and higher terrace surfaces along both sides of the Knife River west of the KNRI and on high ground north of the KNRI. From this survey, Taylor recorded at least 19 new sites within eight km of the KNRI. Based on the presence of moderately to heavily patinated flakes and stone tools, nearly all of these sites contain evidence of pre-Village period occupations. Sites containing diagnostic projectile points also indicative of this age range and recorded in Taylor's survey are listed in Table 23.2 (sites 32ME299 through 32ME306). As can be seen from the table, the diagnostic artifacts range in age from Woodland through Early Archaic, with several unclassified Archaic projectile point forms having been recorded.

SUMMARY

To summarize, there is abundant evidence both from within the KNRI and from sites in the immediately surrounding area for frequent use of the area around the mouth of the Knife River by pre-Plains Village period human populations. Precise data on the chronological placement of most of these components are lacking, but diagnostic projectiles and stratigraphic data from a few locations indicate that occupations spanning the range from Early Archaic through at least the Early/Middle Woodland period (from circa 8,000 to 1,500 BP) are represented. The projectiles that are available from many surface collections within the KNRI and elsewhere indicate that cultural taxonomies based on projectile point typologies for adjacent areas such as the Northwestern Plains (e.g., Frison 1978) will not prove to be adequate for describing and organizing the preceramic period culture-history in the study area. Eventually, when much larger excavated and chronometrically dated samples become available, a preceramic period cultural taxonomy unique to the reaches of the Missouri River valley in North Dakota, and perhaps for a smaller area, should be developed.

The limited surface and subsurface investigations within the KNRI indicate that of the 20 sites documented as containing apparent pre-Village period components, a few may contain substantial cultural deposits in stratified or otherwise datable contexts. Such sites occur in both alluvial settings in A Terrace sediments, and also in apparently older windblown silt deposits. The most promising alluvial cultural sequence occurs at the Elbee site where a definite pre-Plains Village period component has been documented in test excavations as occurring in a paleosol about a meter below the upper terrace surface. Similarly important cultural deposits occur in alluvial, A Terrace sediments at both Big Hidatsa Village and at the nearby Taylor Bluff site.

The eolian context which is most promising for its potential to yield preceramic period components of some substance is at the Scovill site. At that location the upper three members of the windblown silts of the Oahe Formation occur, encompassing a stratified natural sequence about 13,000 years in age. Artifacts have been observed or recovered at various depths within this windblown sequence in both the Pick City and Riverdale Members of the formation, with the oldest observed artifacts estimated to be about 8,500 years in age. The early components at this site have not been investigated through controlled excavation. A similar natural, Oahe Formation windblown sequence occurs at the nearby Hump site, also on the Stanton Terrace, and such a deposit probably exists at the adjoining Youess and Lower Hidatsa Village sites, as well. At the Hump site a spatially definable pre-Plains Village component has been isolated on the ground surface, but test excavation in a nearby area failed to encounter this component below the surface. More extensive testing there and at the other nearby sites in the same natural depositional setting would almost certainly reveal direct evidence of in situ pre-Plains Village period archeological components.

Additional research with preceramic archeology in the Missouri River valley is greatly needed. Most needed are more extensive excavations in sites with in situ, stratified, and datable preceramic age components, such as those discussed here for the KNRI and the surrounding areas. Also of value would be a comprehensive comparison and examination of the many preceramic age projectile points and the diagnostic artifacts of demonstrable pre-Plains Village period age in collections from many locations within the Missouri valley (e.g., at Medicine Crow and the Big Bend area in South Dakota [Neuman 1964; Ahler and Toom 1989]); from reservoir shoreline exposures at many locations in both Dakotas (cf. Ahler et al. 1974; Ahler et al. 1977), and from collections such as those mentioned here from uninundated portions of the valley in North Dakota. Such studies would lay the groundwork for a better understanding and interpretation of changing human adaptation and environmental change during the terminal Pleistocene and most of the Holocene in the Middle Missouri subarea.

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Note: References in which an asterisk precedes the date were supported in whole or part by the Midwest Archeological Center's archeological and ethnohistorical research program for the Knife River Indian Villages National Historic Site.

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CHAPTER 24

ARCHITECTURE AND SETTLEMENT CHANGE IN THE UPPER KNIFE-HEART REGION

Stanley A. Ahler

INTRODUCTION

The purpose of this section is to assemble, within the context of the recently developed regional cultural chronology, available information on architectural patterns, village size, and community plan for the upper Knife-Heart region village sites. Using some of the latter information, an assessment will be made of population change during most of the cultural sequence in the region. In these efforts, the work of Wood (1986b) on these same subjects is used heavily, integrated with data from more recent excavations and with the more detailed cultural chronology which has grown out of the KNRI program (see Chapter 8).

Four sections follow in this chapter. The first deals with data on architecture, summarizing what little is known at the present time. The next section summarizes data on settlement size and community plans. The section after that draws on data concerning community size and artifact density in test excavations to provide an assessment of population change in the region from AD 1200 through AD 1780. A brief summary section concludes this chapter.

ARCHITECTURAL CHANGE

It is has been broadly recognized for a number of decades that the earlier village cultures in the Middle Missouri subarea, generally assigned to the Middle Missouri tradition in Lehmer's scheme (1971), built houses with rectangular floor plans. It is also recognized that at the historic time level all of the earthlodge-dwelling groups in the subarea (Mandans, Hidatsas, Arikaras) built houses with circular floor plans. In South Dakota, this transformation from rectangular to circular houses is fairly directly associated with the change from the Middle Missouri tradition to the Coalescent tradition, and the timing of this change is linked to our ability to date the initiation and proliferation of the Coalescent tradition along the Missouri River trench in South Dakota. The common interpretation is that ancestors of the Arikaras occupied the Coalescent tradition settlements in that area, and when they moved into the subarea from the south, they brought with them the circular house form, displacing the Mandans who lived in rectangular lodges.

In the North Dakota part of the subarea, the nature of the architectural transformation is somewhat less clear. That area expresses a great deal more continuity in cultural groups who used the region. The Mandans and Hidatsas are represented throughout the cultural sequence. At one time, it was assumed that the circular house plan evident at the historic level was used throughout the cultural sequence in the region. It was only with the discovery in 1929 of a rectangular house at the Hensler site by Alfred Bowers that thinking on the subject began to change (Bowers, personal communication to Ahler, December 10, 1981). By the time that Will and Hecker published their synthesis of Missouri Valley archeology in North Dakota, the temporal change from rectangular to circular house forms was well documented in the archeological record. Exactly how and when this change occurred in North Dakota remains to this day a significant riddle for the archeologist, and the upper Knife-Heart region may hold the key to understanding this problem.

Unfortunately, the available data base from the upper Knife-Heart region and from KNRI sites is extremely skimpy with regard to well-dated, comprehensive information on architecture. The few sites upstream from Bismarck which have been subjected to extensive house excavations are virtually all post-contact period sites in the Garrison region. Minor exceptions do occur, but some of the early excavations are poorly reported and poorly dated. Most of the more recent and better-dated excavation work, much of it reported in this volume, deals only with excavation of a few 1 x 2 m or 5 x 5 ft excavation units, hardly capable of yielding meaningful data on architectural patterns.

Most of the available data on architecture for the upper Knife-Heart and the Garrison regions are summarized in Table 24.1. In that table one finds data on house forms discovered at particular sites, the depth of the house floor below the then existing ground surface, whether or not an *atuti* area (Wilson 1934:363) was discovered surrounding the house perimeter, and specific data on house dimensions and estimated floor areas. The dimension and floor area data derive from measurements taken by this author from published and unpublished drawings of floor plans. In some cases these data differ slightly from what various authors have reported concerning house dimensions, largely because the interpretation of a floor plan is to some degree a subjective matter. Different persons will obtain slightly different dimensions from the same floor plan. The stated dimensions and floor areas in this case relate to the pattern and area enclosed within the major peripheral house support posts; the size and area of the *atuti* area is not included here.

The available data can be briefly summarized according to the regional chronology.

A minor excavation revealing perhaps one quarter of a single structure at the Flaming Arrow site (presently unreported) provides the only information from the earliest, Formative Village period (cf. Toom 1988; a speculative reconstruction of the floor plan of this house is

Table 24.1. Summary of available archeological information on architecture in village sites in the upper Knife-Heart and Garrison regions.

Time Period	Site	House Shape	Floor Depth	Atuti?	House No.	Dimensions Within Posts (m)	Floor Area, Excl. Atuti (m^2)
10	Flaming Arrow	Oval ?	35 cm	?	H1	9.75 x 8.0	68.0
20	Clark's Creek	Rect.?	60 cm	-	-	-	
30	Cross Ranch	Rect.	0 cm	?	H3 H7	10.4 x 6.5 9.8 x 5.8	67.6 56.8
	Wh Buff Robe	Rect.	0 cm	?	H1	(14.8) x 9.0	133.2
42	Bagnell	Rect. & Circ.?	20 cm	yes	H3	11.6 x 8.1	94.0
50	Lower Sanger	Circ.?	30 cm	?	-	-	-
	Alderin Creek	Circ.?	0 cm	?	H1	ca. 11.9 m dia	111.2
	Hensler	Rect.	-	yes	-	-	-
70	N Walker's Bu	Circ.	0 cm	?		mean (n=26) 5.68 m dia	25.9
80	Amahami	Circ.?	?	?	H1 H2 H3	13.7 m dia 9.1 m dia 9.3 m dia	147.3 65.0 67.9
	Rock	Circ.	0 cm	yes		mean (n=13) 9.8 m dia	76.1
82-83	Sakakawea	Circ.	0 cm	yes	H28	13.7 m dia	147.3
Unassigned:							
	Elbee	Circ.	0 cm	no	H1	12.0 m dia	113.0
	Grandmother's Lodge	Rect.	45 cm	?	H1	15.3 x 9.1	139.2

Note: Parentheses enclose estimated house length for White Buffalo Robe House 1.

shown in Ahler et al. 1991:30). The house exposed there seems to be oval in form or perhaps rectangular with highly rounded corners. The floor of the house lies in a pit excavated circa 35 cm below the then existing ground surface. Vertical support posts exist at widely spaced intervals around the pit perimeter, and no pattern of major interior supports is evident. Wood from three posts provided the C-14 dates for the Flaming Arrow site. No hearth was encountered. The entrance may be marked by an interior ramp extending from the outside surface level to the lower interior floor level. The presence of an *atuti* area could not be discerned. The covering for the house is unclear; it is not known if it was earth-covered. The only other structure from North Dakota reported in the literature which seems to resemble the house at Flaming Arrow is the oval-shaped house excavated by Hecker at the Menoken site (Will and Hecker 1944:13-15, Pl. 7). Hoffman's (1982) reassessment of the artifacts and data from Menoken suggests that it may date to a time frame comparable to that suggested for Flaming Arrow.

Virtually no architectural data exist for sites assigned to the Clark's Creek phase. Wood notes (1986b:9) that surface depressions at the type site, Clark's Creek, are very large and clearly rectangular in form. The houses are oriented in a northeast-southwest direction along the long axes. Hand coring by Wood suggests that the houses are constructed in pits excavated perhaps 60 cm or so below the then existing ground surface. It is anticipated that these houses will conform in many details to the architecture commonly found in Extended variant, Middle Missouri tradition sites downriver in North Dakota and throughout South Dakota (cf. Lehmer 1971).

Data on Nailati phase architecture are available from two sites, Cross Ranch and White Buffalo Robe. Both of these sites have been reported in detail, and we will not reiterate much of that detail here. At Cross Ranch (Calabrese 1972:8-13) the interior floors of two houses were completely excavated. These are both rectangular structures with regular rows of posts along each long wall, with few posts at either end, with major central support posts along the long centerline suggesting a gabled roof arrangement, and with long entryways facing to the southwest. Both houses were apparently constructed directly on the ground surface. The presence of the *atuti* feature is uncertain. It also is not clear if these structures were earth-covered. A portion of a rectangular house was excavated at the White Buffalo Robe site (Lee and Hetland 1980:131-132). This structure was occupied but briefly, then burned, and was apparently abandoned with many items stored there for future use. The excavation crossed the center of the house but did not encounter either end. Thus, only the width of the house can be measured accurately. Based on the length-width ratios for the two houses excavated at Cross Ranch, we can estimate a length for this house at White Buffalo Robe and can compute an estimated floor area. The area thus computed shows this structure to be at least twice as large as either excavated structure at Cross Ranch.

No architectural data exist for any of the numerous sites assigned to the Early Scattered Village complex (AD 1400-1450) in the regional samples. The chronologically next bit of architectural data comes from the Bagnell site, via major excavations conducted there by Lehmer in the years 1970-1973. We have very tentatively assigned this site to our Late Scattered Village complex, AD 1450-1525. All or portions of several houses were excavated by Lehmer at Bagnell, but data on only a single structure (House 3) have been reported (Lehmer et al. 1973). This is a rectangular structure, similar in many respects to the dwellings at Cross Ranch, except that it exhibits evidence of having been occupied for a long period of time. Like the Cross Ranch houses, the entryway is marked by posts at either end connected by a trench, presumably to hold the butts of puncheons, with the entry facing the southwest. Bagnell House 3 burned, and by this circumstance, data on the presence of an *atuti* surrounding the house were well preserved. The floor of the house interior was about 20 cm below the level in the *atuti* area. Lehmer et al. (1973) offer a hypothetical reconstruction of the superstructure of the house, including the *atuti*, and suggest that the *atuti* may have been used with other rectangular houses in the region.

It has been suggested that both circular and rectangular houses exist at the Bagnell site (Wood 1986b:11, 15). Indeed, House 1, excavated in 1970 in an unconventional circular excavation unit divided into pie-shaped segments, was anticipated prior to excavation to be a circular house. An inspection by this author of all floor plans, including House 1, from Lehmer's work at the site failed to reveal any convincing evidence of circular architecture at Bagnell. It is possible that only rectangular house forms were used at Bagnell and that midden accumulations and repetitive occupations of the site have tended to obscure the clarity of the rectangular house forms as visible from the present site surface.

A minor amount of data on architecture exists for the subsequent Heart River phase. Wood (1986b:13) reports the excavation of one edge of an apparently circular house at Lower Sanger. While a circular (or any particular) house form cannot be convincingly demonstrated from this test, it did document that the floor of the tested structure was placed in a pit or depression circa 20 cm below the surrounding preexisting ground surface.

A more extensive excavation encompassing a dwelling unit was conducted by the State Historical Society of North Dakota at the Alderin Creek site in 1968. This work is unreported, but the field plans of the excavation were made available to the author. Wood (1986b:13) also describes the single house in these excavations. The excavated house is probably circular in form but it has a very ill-defined architectural plan. A puncheon trench entryway and central hearth are present, but the margins of the house cannot be clearly defined. Posts of various sizes are scattered through the house area. The structure was apparently constructed directly on the existing ground surface. No evidence of an *atuti* is apparent in the field drawings. Wood from several features in this house was used to provide the reported C-14 dates for this site.

Bowers (1965:481 and personal communication to S. Ahler, December 10, 1981) has provided an interesting bit of information on a house structure excavated by him at the Heart River phase Hensler site in 1929. Bowers expected to find circular houses, but instead uncovered at least one complete rectangular structure. The structure had a double row of eight central support posts, parallel straight rows of posts along either side, a flat front and a slightly curved rear. Bowers has interpreted this as a Mandan ceremonial lodge, and on that basis, it may not be typical of the everyday dwellings at the site. Bowers reports the use of the *atuti* for this house or for portions of other structures at the Hensler site.

Key sites in the following periods in the region are Lower Hidatsa and Big Hidatsa, and virtually no data on architecture prior to the period of historic documentation exist for these sites. The next archeological information comes from Nightwalker's Butte, assigned to the eighteenth century. At least 26 structures were excavated here (Lehmer et al. 1978:71-120). All are extremely small in comparison with other excavated houses in the region, having floor areas one-half to one-fourth as large as most other excavated structures. This is probably due to the remote butte-top location of the village and the problems of hauling the timber necessary for earthlodge construction to that location. Probably for the same reasons, the architectural details there are also somewhat ill-defined. Nearly all houses exhibit evidence of an apparently circular form, with four central support posts about the central hearth. Support posts around the margin of the house are very irregularly placed. The houses were apparently constructed directly on the existing ground surface. *Atuti* areas are not confirmed but probably were present, judging by the wide spacing of the marginal roof support posts. These houses seem to conform, in a somewhat haphazard way, to the historically recorded patterns of architecture for Hidatsa earthlodges (Wilson 1934).

The only detailed archeological data on architecture from the period post-dating AD 1780 derive from Amahami Village and from Rock Village. The best data exist for Rock village where at least 13 briefly occupied structures were excavated in their entirety (Hartle 1960; Lehmer et al. 1978:11-40). The best description of these houses is that they conform in almost all details to the historically documented construction patterns for the Hidatsa earthlodge, as detailed by Wilson (1934). They are very regular and uniform in pattern and size, with four minor variations of floor plan occurring based on peripheral post numbers and arrangements. All have a four central post arrangement around a central hearth, with 9 to 12 roof supports at the house perimeter. An entryway defined by interior and exterior posts and puncheon walls set in a linear trench occurs in nearly every house. The *atuti* is evident in several houses and was probably used in all houses. The houses were constructed directly on the existing ground surface, perhaps following the removal of the sod from the central floor area.

Architectural data from Amahami Village are less clear. Dill (Lehmer et al. 1978:152-159) reports three historic period, circular houses from the site. The study of pottery conducted in this volume indicates, however, that House 1 defined by Dill occurs over a heavy concentration of early period, Nailati phase features. It is thought by this author more likely that the confusion of post molds, pits, and the trenched entryway and hearth defined for House 1 actually relate to an ill-defined rectangular house at the

Amahami site. Houses 2 and 3, having ill-defined circular forms but distinct four-post central support arrangements, are probably correctly associated with the historic period component at Amahami. The superposition of occupations at this site makes decipherment of any architectural details a difficult task, particularly when working with a data set which was hastily collected and which has not yet been adequately analyzed.

Salvage excavations at the Sakakawea Village (Ahler et al. 1980) in the KNRI have yielded minimal size information but little other data for a single circular lodge exposed in the Knife River cutbank (Table 24.1).

Architectural data at two other sites not in the mainstream of the present study can be mentioned. Excavations at Grandmother's Lodge (Woolworth 1956) revealed the plan for a rectangular dwelling having a form very much like that found at Cross Ranch and Bagnell. The house is quite large, about the same size as the single rectangular dwelling at White Buffalo Robe. The placement of this lodge floor in a shallow pit estimated to have been circa 45 cm below the preexisting surface suggests an early temporal period, perhaps in the Clark's Creek phase. Although the pottery sample from the site is extremely small, nothing in that sample nor other data contradict such a culture-historic placement for the site.

Salvage excavations at the Elbee site revealed a portion of a single circular house floor plan badly disturbed by cultivation (Ahler 1984). The outer wall of this house is apparently characterized by the presence of many closely spaced, small, vertical posts and more widely spaced larger posts. This plan is similar to that seen at many Extended Coalescent sites in South Dakota (for example, House 12 at Lower Grand and House 19 at Walth Bay [Ahler 1975:Appendices A and B]). The closely set spacing of the peripheral wall posts also seems to eliminate the possibility of an *atuti*, providing one more distinction between the Elbee house and historic Hidatsa architectural patterns (Wilson 1934). This house as well as the unusual ceramics from Elbee formed the basis for concluding that the site likely represents a site-unit intrusion of Arikara/Extended Coalescent peoples into traditional Hidatsa territory.

In summary, the existing data from the upper Knife-Heart region confirm substantial changes in architecture among the village populations, but the details and timing of those changes remain somewhat obscure. The earliest reported house form is apparently subrectangular or oval in shape and semisubterranean. The fully rectangular and semisubterranean form seems to occur in the Clark's Creek phase. A major change in the Nailati phase is the construction of houses, still rectangular, on the ground surface rather than in a shallow pit. Data from Bagnell confirm the continued use of the rectangular surface house into apparently the later part of the Scattered Village complex, and the evidence for the *atuti* is present at this time. The basic house form apparently changes from rectangular to circular, at least at some sites, in the subsequent Heart River phase. The details of these circular houses are extremely obscure, and it seems that a mix of house forms may have been in use in the AD 1500s. Detailed data on circular house plans do not emerge from the archeological record until late in the 1700s, by which time historical data on the same subject were beginning to be written down with some regularity.

Discovery of the use of "leaners" around the house periphery and therefore the existence of an *atuti* area in association with rectangular houses is one of the significant items to emerge from the scanty regional data set. Based on Hidatsa oral traditions, though, this should come as no surprise, as the Awatixas record the existence of the *atuti* in lodge construction from their earliest times at the Flaming Arrow site (Bowers 1965:481). What we may discover, as Bowers has suggested, is that the *atuti* is a distinctly Hidatsa, as opposed to Mandan or Arikara, housebuilding trait, one which therefore can be used to illuminate the migrations and interactions of these various ethnic units in the early archeological record.

SETTLEMENT SIZE AND COMMUNITY PLAN

Data on several variables relevant to community plan are summarized for regional village sites in Table 24.2. The primary variables included in that table are information on estimated site area, number of houses visible in the settlement, a computed density of houses expressed as houses per hectare, and data on the presence or absence of evidence for fortifications. The data presented in this table derive from the archeological record only, and do not incorporate information on house numbers which begin to be available for specific sites upon David Thompson's 1797-1798 visit to the Knife River area (Wood 1977a; Wood and Thiessen 1985).

Table 24.2. Summary data on settlement size and community plan for selected village sites in the upper Knife-Heart and Garrison regions.

Period	Site	Site Area, ha	Number of Houses	Density Houses/ha	Forti- fied	Data Source	Comment
10	Flaming Arrow	1.4	13	9.3	poss.	a,w	est. total area
20	Clark's Creek	1.6	14	8.8	no	b:20,21	
	Stiefel	3.2	-	-	-	c	
30	Upper Sanger	2.0	-	-	-	d	area on lower terrace only
	M.P. 28	3.0	-	-	no	e	
	Cross Ranch	2.7	-	-	no	e,f:50	est. total area
	Cross Ranch	1.3	9	6.9	no	e	area west of RR
	Mahhaha	3.5	-	-	-	g	
	Wh. Buff Robe	2.8	20?	7.0?	no	h	est. total area
	Amahami	2.3	-	-	-	g,i:147	
	Buchfink	3.9	-	-	?	j:222	
	Stanton Ferry	3.0	-	-	-	k	
41	Pretty Point	8.1	-	-	-	l:108	
	Upper Sanger	3.0	-	-	-	m:320	est. total area
	Upper Sanger	2.3	25	10.9	-	m:320	area east of RR
	Mandan lake	3.5	-	-	-	b:36	
	Shoreline	1.1	17	15.4	-	m:322	
	Mahhaha	3.5	-	-	-	g	
	Lyman Aldren	2.8	-	-	-	l:112	
	Big Hidatsa	0.8	-	-	-	n	
	Poly	4.2	-	-	-	j:235-236	
	Scovill	1.5	-	-	-	j:237	
	Forkorner	7.0	-	-	-	j:241	
	Hump	2.5	-	-	-	j:242	
	Youess	3.2	-	-	-	j:243	

Table 24.2. Continued.

Period	Site	Site Area, ha	Number of Houses	Density Houses/ha	Forti-fied	Data Source	Comment
42	Bagnell	3.9	97	24.9	poss.	b:36	
	Mandan lake	3.5	97	27.7	-	b:36	
	Mahhaha	3.5	-	-	-	g	
50	Smith Farm	1.8	27	15.0	yes	b:36	
	Lower Sanger	1.6	34	21.3	yes	b:36	
	Hensler	4.0	125	31.3	-	b:36	
	Alderin Creek	3.0	-	-	yes	b:41	crude area est.
	Wh Buff Robe	2.0	-	-	-	h	
	Lower Hidatsa	2.0	-	-	-	o	
60	Mahhaha	3.5	-	-	-	g	
61	Lower Hidatsa	2.0	-	-	-	o	
	Big Hidatsa	2.4	45	18.8	-	n	
62	Lower Hidatsa	2.0	-	-	-	o	
	Big Hidatsa	3.2	58	18.1	-	n	
70	Molander	1.8	42	23.3	yes	p	upper terrace
	Mahhaha	3.5	-	-	-	g	
	N Walker's Bu	0.5	28	56.0	yes	i:65,71	
71	Lower Hidatsa	2.0	57	28.5	no	o	
	Big Hidatsa	4.1	75	18.3	-	n	
72	Lower Hidatsa	2.0	57	28.5	no	o	
	Big Hidatsa	5.2	95	18.3	-	n	
Post-AD 1780/90 Sites That Can Be Assigned Specific Bracketing Dates							
Date							
1800-45	Amahami	1.3	21	16.2	yes	g,i	fort area only
1780-1845	Rock	1.2+	35+	29.2	yes	i:14	minimum area and house count
1790-1800	Sakakawea	2.2?	-	-	yes	q	
1790-1800	Greenshield	1.5	40	26.7	yes	r	

Table 24.2. Continued.

Period	Site	Site Area, ha	Number of Houses	Density Houses/ha	Forti-fied	Data Source	Comment
Post-AD 1780/90 Sites That Can Be Assigned Specific Bracketing Dates, continued							
1800-45*	Sakakawea	2.2+	41+	18.6	yes	q	minimum area and house count
1790-1830	Big Hidatsa	4.7	86	18.3	yes	n	
1830-45	Big Hidatsa	2.2	40	18.2	yes	n	
1810-62	Fort Clark	5.3	71	13.4	yes	s	
1790-1862	Deapolis	2.8	-	-	yes	b:47	
1861-62	Star	4.0	85	21.2	yes	t	
1830?-62*	Taylor Bluff	1.8	-	-	yes	u	
Other Unassigned or Unstudied Village Sites, Upper Knife-Heart Region:							
32BL10	Painted Woods	3.6	-	-	-	l:83	not tested
32OL114		3.6	-	-	-	v	not tested
32OL106		-	-	-	-	v	not tested
32OL6	Price	1.8	-	-	-	l:107	not tested
32OL7	Molander, lower part	2.4	-	-	-	l:107-8	lower terrace area only
32OL10	Wildwood	3.2	-	-	-	l:108	difficult to relocate
32OL15		3.2	-	-	-	l:109	difficult to relocate
32OL422	Haystack	0.4	-	-	-	f:52	not tested; on Cr. Ranch
32OL423	Levis	0.4	-	-	-	f:54	not tested; on Cr. Ranch
32OL19	Dennison	1.9	43	22.6	-	b:36	major site; not tested
32OL20	Connolly	3.2	-	-	-	l:110	not tested
32ME203	Big White	5.0+	-	-	-	v	not tested
32ME6	Boller	1.4	12	8.6	yes	l:113	destroyed
32ME101	Sagehorn	-	-	-	-	g,v	not tested
32ME416	Elder	2.3	-	-	-	j:244	not tested; in KNRI
32ME487	Lo Hidatsa E.	2.7	-	-	-	j:257	not tested; in KNRI
32ME408	Elbee	3.1	-	-	-	j:236	tested; Ari-kara trad.?

Table 24.2. Concluded.

Period	Site	Site Area, ha	Number of Houses	Density Houses/ha	Forti-fied	Data Source	Comment
Other Unassigned or Unstudied Village Sites, Upper Knife-Heart Region:							
32ME464	Yellow Bear	0.6	-	-	-	j:244	not tested; in KNRI
32ME312	Madman's Bl	1.2	-	-	-	j:232	not tested; in KNRI
32ME410	YCC	1.0	-	-	-	j:239	not tested; in KNRI
32ME311	Black Owl	2.6	-	-	-	j:231	not tested; in KNRI

Notes on data sources:

a UND 1982 project field records
b Wood 1986b
c site form, Paul Ewald, 1968
d estimate from air photo in Wood/Lehmer 1968 project records showing lower terrace
e Calabrese 1972:Fig. 2
f Weston, Kjos, and Ahler 1978
g data in Wood/Lehmer 1968 testing project records and notes
h Lee and Ahler 1980:Fig. 3.1; Lee 1980; period 30 house count is based on spacing between excavated house areas.
i Lehmer et al. 1978
j Lovick and Ahler 1983
k Ahler and Swenson 1980:35
l Will and Hecker 1944
m Will 1924
n Ahler and Swenson 1985:262-269
o Ahler and Weston 1981:Fig. 2
p T. H. Lewis map made in 1883, copy in Wood/Lehmer 1968 project notes
q Ahler et al. 1980:18,20,21
r Nicholas and Johnson 1986:456
s house count from Libby 1908:Plate II; site area from Wood 1986b:18
t Metcalf 1963a:73
u Ahler et al. 1983:7
v official site files, State Historical Society of North Dakota
w Bowers 1948:115-116

* Based on analysis of data from Taylor Bluff (Ahler 1988), revised dates for Sakakawea Village would be 1800-1834 and for Taylor Bluff would be 1834-1845.

The data in this table derive from a large variety of sources, as documented in the notes following the table. We are particularly fortunate in having available to us a number of highly detailed maps of many of the more substantial villages in the region which were drawn in the early part of this century by trained surveyors and cartographers (cf. Wood 1977b and 1986a for a review of these map-making efforts). The result is a large amount of fairly accurate information on site size and house depression counts which would today be otherwise unobtainable. Where possible, we have relied on data in these early maps, as published in various sources, and as unpublished but used by Wood (1986b) or available in the Wood/Lehmer 1968 project notes, to develop the data base in Table 24.2. Probably the least reliable data in this table derive from the narrative comments in Will and Hecker (1944) on site size, usually expressed only as an approximate acreage (e.g., four to six acres), or from the site forms for some sites, which are equally general in most cases.

In a few cases where sites have a long history of occupation spanning multiple time periods, we have used the mapped or counted surface house depression data to compute house density information for only the most recent temporal period or culture-historic unit. This is the case, for example, at Mandan Lake which spans both the Early and Late Scattered Village complex periods, and at Lower Hidatsa which spans Heart River phase through early Knife River phase periods. In most cases where multiple temporal periods are present at a site, it is not possible to estimate the precise area of occupation or site size linked to each period of occupation, and the entire site area is used in regard to each occupation period. This is not true at Big Hidatsa, which was tested in sufficient extent to allow us to estimate changes in village size through time (Ahler and Swenson 1985:262-269).

Positive evidence of fortification usually occurs in the form of a distinct ditch evident on the ground surface and on aerial photographs. Negative evidence of fortification is less reliable. Fortifications may have existed in the form of a palisade or picket in the absence of a ditch, and evidence for such will be extremely unclear without having conducted substantial excavations.

Using the data in Table 24.2, we can briefly summarize some of the most apparent temporal changes in community and settlement plan within the regional sites. We can mention fortification first, because it is related to some of the other variables to be discussed. Clear evidence for fortification is absent from the record prior to the Heart River phase. A possible exception to this may occur at the Flaming Arrow site. The oral tradition regarding the site tells of an attempt to build fortifications to defend the inhabitants from other hostile peoples in the vicinity (Bowers 1965:304-308), and examination of aerial photographs of the site reveals faint patterns which may be the remains of a fortification ditch. It is of note that a bastioned fortification ditch surrounds the Menoken site near the Heart River (Will and Hecker 1944:79-80) which we would liken to the Flaming Arrow site in ceramic content and possible age (cf. Hoffman 1982).

Fortification involving an irregular ditch and a palisade line interior to the ditch was uncovered at Alderin Creek (SHSND project notes, 1968). A ditch has been well-documented at Lower Sanger, and one is evident on aerial photos of Smith Farm (Wood 1986b). In all cases, these seem to be fortifications without regular bastions. Thus, the evidence is clear that at least half of the regional sites assigned here to the Heart River phase were once fortified. The evidence also suggests that fortifications existed at the smallest and southernmost of these sites, apparently occupied for the shortest periods of time by perhaps smaller numbers of people. The meaning of this is not clear, except perhaps that it could be a pattern associated with site-unit intrusions of Mandan populations into the region as documented in oral traditions and as suggested by ceramic data (cf. Chapter 17 on ceramic analysis).

Evidence for use of fortification in the seventeenth century is unclear. Eighteenth-century evidence is also unclear, but slightly less so. Nightwalker's Butte, probably established on a butte-top for defensive purposes in the first place, was clearly although not heavily fortified (Lehmer et al. 1978:70-71). Molander, thought to date in the AD 1700s, has an exceptionally clear fortification system which is unusual in that it involves the presence of no less than 10 distinct bastions. Is it possible that this fortification system was constructed by very early inhabitants at the site (presently unrecognized in the material culture) and was later reused by the post-contact period inhabitants? Wood (1986b:21) cites evidence to suggest that the clarity of the fortification system may have been enhanced by construction workers when the site was fenced as a state historic property.

By the close of the eighteenth century we begin to get good historic descriptions of all the villages in the region, including the local Hidatsa settlements and the Mandan refugee settlements. Without exception, these sites are described as fortified by palisade or picket. The archeological evidence is often somewhat obscure, with only fragments of irregular ditches remaining today to mark the locations of such fortifications around even some of the best preserved sites. It seems that the fortification systems in the historic period probably relied most heavily on the palisade and did not use a ditch in a regular, systematic manner. The reason for fortifications in the historic period is clear, as the villagers were constantly under siege from the Sioux and, less regularly, from other nomadic groups (note Hanson's discussion of Hidatsa warfare in the historic period, Chapter 16, this volume).

We can now turn to summary information on site size compiled by time period. These data are illustrated in Figure 24.1. What can be seen is a progressive and steady increase in site size from the Formative Village period, pre-AD 1200, through the Late Scattered Village complex, extending into the early sixteenth century. This is followed by an abrupt decrease in settlement size on the order of 33 percent in the Heart River phase. Thereafter, settlement size seems to vary somewhat erratically, but the mean never exceeds the figure of 3.0 ha which was evident in the AD 1400s. The abrupt decrease in settlement size after AD 1525 coincides well with the appearance of fortifications in the Heart River phase. This makes good sense. A village fortification system required a considerable investment of both labor and timber for its construction. The more compact a settlement could be made, then the less expensive the fortification system would be, without any loss of effectiveness. It seems logical that settlements were reduced in size to coincide with the practice of enclosure of the settlement in a fortification system.

Data on the density of houses within settlements are displayed according to time in Figure 24.2, and these data show some interesting patterns. It should be noted that these data derive from extremely few sites, particularly in the early periods where mapped sites are extremely rare. These data show a low overall house density continuing through the Early Scattered Village complex, then a sudden increase in settlement compactness in the Late Scattered Village complex. These data show that the compactness of the settlements through the early period does not closely follow the growth in settlement size shown in Figure 24.1. While settlements were expanding considerably in size through the early AD 1400s, the settlements also remained fairly dispersed in community plan. This changed abruptly in the late AD 1400s/early AD 1500s when house density suddenly increased dramatically to a figure more than two times as great as in any previous period. Interestingly, though, this increase in compactness seems to precede slightly the evidence for use of fortifications in the regional sites. This suggests that a major change in village settlement systems leading to greater nucleation (perhaps some political organization or change in subsistence strategy) preceded a period of increasing hostilities linked to fortification. From the period of the Heart River phase on, post-AD 1525, the villages remain fairly compact, as we might expect since this seems to coincide with a period of fairly consistent fortification. After AD 1525, the settlements never again become as dispersed as they were in the earlier, developmental periods of the village culture in the region.

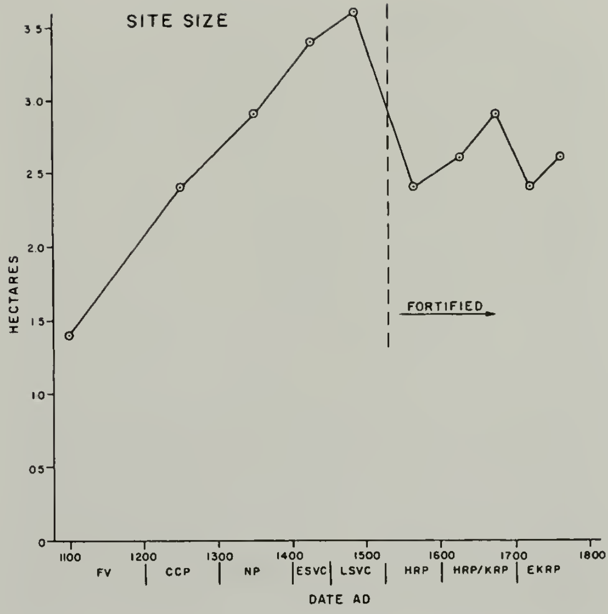

Figure 24.1. Graph of mean site area in hectares by time period in the upper Knife-Heart region.

POPULATION CHANGE

One of the key variables in any discussion of settlement change is that of overall population density. Any comprehensive statement on settlement change must take into account changes or stability in regional population levels. The subject of population density or population level is of particular relevance in light of research by Dobyns (1966, 1983) having to do with the effects of the introduction of Euroamerican disease on Native American population levels. It is Dobyns' thesis that several highly virulent Old World pathogens were first introduced at a very early date in the sixteenth century, and repeatedly many times thereafter, throughout most if not all of the New World, and that these pathogens caused repeated epidemics which spread through the continent well ahead of direct Euroamerican contact or even, in most cases, ahead of material evidence for indirect contact. Dobyns further contends that these epidemics caused drastic population collapse throughout much of the New World at a very early point in time, and that most historians and prehistorians have not adequately considered such factors in their interpretation of the New World archeological record. Dobyns documents his case by detailed studies of native groups in present-day Florida and New England.

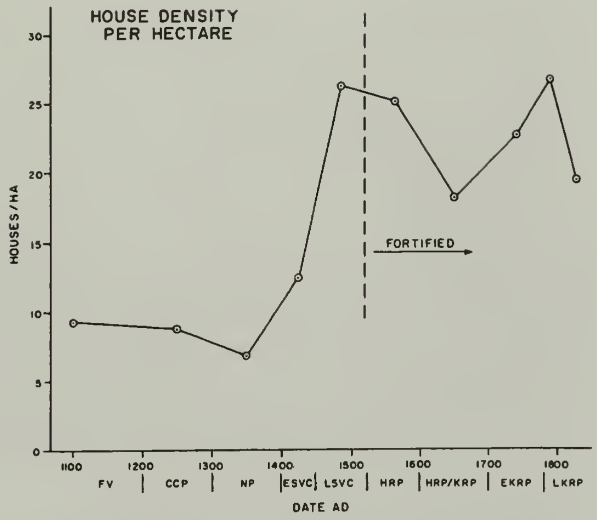

Figure 24.2. Graph of mean settlement density, measured in houses per hectare of settlement area, plotted according to time period in the upper Knife-Heart region.

Clearly, if Dobyns' ideas are correct, it behooves us to gain some control of population data in our study area.

While there is little direct historical documentation for epidemic disease of Euroamerican origin in the study area prior to the well-recorded AD 1780-1781 epidemic, there is certainly a great deal of indirect data from other regions which strongly suggest that Middle Missouri subarea populations should have been seriously affected by introduced disease as early as AD 1525-1530 and certainly by the seventeenth century. This information is summarized in a paper by Trimble in Chapter 15, this volume, dealing with introduced disease in the study area. Ramenofsky (1982) has pursued and attempted to test Dobyns' predictions of early population collapse throughout North America.[1] One of Ramenofsky's case studies was in the Middle Missouri subarea, where she found considerable evidence supporting the hypothesis of significant population reduction as early as the seventeenth century (1982:324).

Ramenofsky's study is a monumental undertaking which involved synthesis of data from throughout the subarea on settlement size, house size, material culture, and chronology. Lacking a consistent chronology for the entire region, she developed her own five-period framework for the region based on a pottery seriation fine-tuned by radiometric dates and data on various classes of trade goods. She computed three different measures of archeological population for the various time periods, based on settlement counts, settlement area, and roofed area by time period, adjusted per 100-year units of study. While Ramenofsky's study is monumental, and her conclusions are probably valid, the results suffer from a lack of precision, as she herself concedes. Due to the many underlying assumptions and limitations in the available data, Ramenofsky's population measures can only be compared across time on an ordinal scale rather than the more desirable interval or ratio (calendrical) scale. Difficulties in the data set used have to do with imprecise chronology, biased sampling of sites by time period, the inaccuracy of the assumption that duration of site occupation is constant across sites and through time, and variations in recovery procedures which resulted in the available archeological data base. Ramenofsky is herself aware of most of these limitations (1982:289-295).

In a lengthy and informative discussion of methods for estimation of archeological population, Ramenofsky (1982:108-126) notes that what is needed is a surrogate measure of population which is readily available and measurable in the archeological record. She chose settlement count, settlement area, and roofed area as such surrogate variables. The first two of these types of data are available to us in our data set, but their use is severely limited by a lack of understanding of the duration of individual site occupation. It is evident that the sites in our sample differ greatly in duration of occupation, but we have no direct method for controlling for that. The latter variable, that of roofed area, is limited by the availability of data on architecture, which, as we have summarized, are relatively meager in our study area. Even so, the available data could be used to project estimates for sites where house counts and architectural data do not exist, and with some means of controlling settlement duration, we could compute population estimates in one of the manners proposed by Ramenofsky.

Rather than pursue this complex avenue of investigation, we have attempted to use another more directly quantifiable surrogate measure of archeological population, this being the estimated rate of pottery production in the villages under study. If we can assume that all of the villages we are studying are broadly similar to each other in terms of function and placement in settlement and subsistence systems, then it is appropriate to use the quantity of occurrence of an ubiquitous, short-lived artifact class such as pottery as a measure of archeological population. We must restrict the study to permanent/semipermanent settlements having permanent habitation structures, occupied throughout at least the warm months of the year by all members of the society and by all aspects of the family unit. All villages included in the sample must have shared a common subsistence base linked to mixed horticulture, gathering, and big game hunting, and all cultural groups must have consistently made and used pottery to serve in a wide array of domestic activities. The method proposed here further assumes that pottery production rates, per household unit or per person, would not have changed significantly through time, that pottery breakage rates would not have changed significantly through time, and that the functional integration of pottery into the full cultural system would not have changed significantly though time.

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[1] Since the time of this writing (1986), Ramenofsky's dissertation has appeared in published form (1987). (S.A.A.)

This series of assumptions and limitations prohibits use of this method for the earliest samples included here (Flaming Arrow and Formative Village sites) which are of questionable similarity to the remainder in terms of overall settlement/subsistence classification. We must omit data from temporary settlements and seasonal camp sites such as the Late Woodland camps, the PG and Angus sites, and all of the myriad village periphery areas documented at the KNRI. We also must assume the method to be inappropriate for study of late post-contact period samples dating after AD 1780 when metal artifacts had become an important and functionally significant replacement for native-made ceramics in the villagers' technological systems. Prior to AD 1780, few metal containers were used in the villages, and the technological aspects of pottery production were little affected by Euroamerican contacts and influence (cf. Chapters 17 and 21 on ceramic change and trade artifacts, respectively). After AD 1780, it is another matter, and pottery from those sites cannot be used in such an approach.

The method is therefore simple. We estimate the rate of disposal of pottery into the archeological record at various points in time. We assume that variation in the pottery disposal rate is a direct measure of variation in the number of potters and pottery users, i.e., the general population, residing in the region through time.

Given the available data sets, measurement of the rate of pottery production is a relatively straightforward matter, not confined by a lack of control on individual site occupation duration, as long as the sites can be assigned to common time units of known duration. The count of ceramic vessels recovered from controlled excavations in each studied site is divided by the surface area of that excavation to arrive at a pottery density value per unit area (per square meter) for each tested site. This value is then multiplied by the total area for each site to yield an estimate of the total number of pottery vessels within each site. These site values are then summed for each time period to yield a total count of pottery vessels for the period. Dividing this sum by the duration of the period in years yields an estimated annual rate of pottery production/disposal for that period. Similar rate estimates are computed for each period, and comparisons of rates across periods are assumed to reflect comparisons of population levels across periods.

At least two sources of error exist in this approach, other than those mentioned and accounted for. One has to do with variation in within-site sampling. It can be argued that the sample of pottery from one or from a few test pits may produce a biased measure of pottery density for a site. This is true, but the degree and direction of bias in this regard is likely to be relatively consistent across sites. In almost all instances tests were placed in villages at locations which were anticipated to be highly productive. While the pottery density estimates obtained from these tests may be overestimates of average density throughout the site, they will all tend to be overestimates to a similar degree, therefore allowing us to compare the density measures across sites and time periods. Also, while such tests do not necessarily sample all deposits of different time periods in a multicomponent site in proportion to the relative durations of occupation by period at a site, such errors will tend to even out across several multicomponent sites because the excavators almost always had no prior knowledge of the actual time period components to be found within the area chosen for excavation. In regard to sites which have pottery samples assigned to multiple time periods, we have chosen to compute site densities for each time period based on the frequencies of the vessels in the batch sample assigned to that period divided by the total area of excavation within the site (even if some of the test pits did not encounter pottery in that particular time period). This should provide some compensation for varying duration of occupation by time period at multi-period sites.

The second source of error has to do with archeological sites which are not included within the present computations. How representative is our site sample from each time period? The list of village sites which are known but which have not been studied is fairly large, as shown in the final section of Table 24.2. The effect of omitting these sites is probably not significant, however, particularly with respect to exploring the idea of population collapse in the latter part of the temporal sequence. Ramenofsky (1982:113-114) notes that because of the use of the "direct historical approach," sites dating in more recent time periods tend to be more well-known and better represented than older sites. This would tend to lead to underestimates of early population levels compared to late period levels, strengthening any findings supporting the idea of epidemic-derived population collapse. Another aspect of this problem has to do with sites which have not yet been discovered. Intensive surveys of small areas on the Cross Ranch and at the KNRI indicate that a large number of less prominent village sites may exist in the region which have not yet been inventoried. The existing data base is highly biased toward the largest, most prominent and most visible sites. The great majority of the less prominent sites which have been found in the limited surveys seem to date in periods predating AD 1600, and probably before AD 1525. The omission of similar undiscovered sites leads to underestimates of the population levels in the periods assigned to the Clark's Creek phase, the Nailati phase, and the Scattered Village complex.

We can now move to a discussion of the available data on pottery production as a surrogate measure of population levels. Table 24.3 summarizes the pertinent data for all site samples available for study. The site area data are taken directly from Table 24.2. The data on pottery vessel counts are confined to excavated samples only. These frequencies are taken from the vessel frequency data presented in Table 17.1 for the relevant batch samples, adjusted where necessary by the exclusion of surface collected pottery vessels. Vessel counts for Bagnell are taken from Lippincott (1970:34). Pottery density data could not be computed directly for certain batch samples. These include the surface collected samples and a few others: White Buffalo Robe density could not be computed because the site was scraped with a grader prior to excavation, removing part of the collection; consistent recovery techniques and pertinent excavation area data were not available for the Amahami site and Alderin Creek site samples. In each of these instances, a mean density value was first computed from the sum of all vessels in all controlled excavations at all sites within the same time period, and this mean density value was then used as an estimate for each site having less controlled or no controlled excavation in that same time period.

The estimated pottery content values for each site or batch sample are computed by multiplying the computed or estimated density value by the site area in Table 24.3. These site totals of pottery vessels are then summed to yield a period total. Virtually all of these figures are overestimates due to both the bias towards excavation in productive site areas, and due as well to the degree of fragmentation within a vessel and the nature of our samples. In our samples, a given vessel is usually represented by a single rim sherd or at most a few sherds. Thus, the computed sums for total "vessels" within sites and by time periods probably more closely reflect the total number of rim sherds rather than vessels. If all of these sherds were fully matched and refitted into actual vessels, the vessel count would be significantly lower than the totals we have computed. Regardless, these biases are thought to be consistent across sites and across time periods, not limiting the use of the computed data for temporal comparisons.

Table 24.4 lists the summed vessel count for each time period sample, the duration of each time period, and a computed pottery production rate for the period expressed as vessels per year. The data for the 50-year increments in periods 61, 62, 71, and 72 are adjusted by adding in half of the vessel sum data for the respective and related 100-year periods, 60 and 70. The resulting vessel production rates are plotted graphically in Figure 24.3.

Making the direct translation from pottery production rate to population level, Figure 24.3 indicates major changes in archeological population through time during the period AD 1200 through AD 1780. Population levels are at a minimum in the Clark's Creek phase, the earliest full village pattern time period. A substantial population increase occurs during the Nailati phase, and then an even more phenomenal increase occurs in the subsequent Early Scattered Village complex period, AD 1400-1450. A precipitous decline occurs immediately thereafter, in the late 1400s and early 1500s, in the Late Scattered Village complex. The decline continues at an apparently slower pace in the Heart River phase, then accelerates again in the early post-contact period, immediately after AD 1600. Population levels in the early 1600s are about one-ninth as great as during the peak level in the Early Scattered Village complex. After the early AD 1600s, regional population increases slowly but apparently in a steady manner through the latter half of the AD 1700s leading up to the AD 1780 epidemic.

Of particular note here is the fact that comparison of Figures 24.2 and 24.3 indicates that the significant increase in house density noted in the Late Scattered Village complex actually coincides with the abrupt decrease in population at that time (AD 1450-1525). What is evident here is apparently the process of population collapse followed by an abrupt reorganization of the culture into a smaller number of concentrated or amalgamated settlements. This degree of concentration is maintained in the following periods as population continues to decline. By the late AD 1500s, settlement size has also markedly declined, with there possibly being too few people in the region to maintain any sites of the size that existed only one hundred years earlier.

The data for pottery content in individual sites in Table 24.3 provide interesting information on the duration of occupation and relative importance of various sites as major, lasting population centers. The most significant, most heavily occupied, and longest lasting sites contain the most pottery and the highest pottery densities. The data from the Nailati phase sites are not too diverse, indicating that each settlement may have been used for approximately the same length of time and by similar numbers of people. Of the Nailati sites, Cross Ranch stands out as being most prominent.

The density values for individual Early Scattered Village sites are much more divergent, indicating basic differences in settlement type. Upper Sanger is extremely prominent; based on its extremely high pottery density, we would suggest that it was permanently occupied for the duration of the Early Scattered Village complex period. Other substantial sites of secondary importance include Pretty Point, Shoreline, and Mahhaha. Then there are all the sites within the KNRI which exhibit uniformly very low pottery densities but generally large areas. These appear to be very dispersed communities, occupied perhaps for very short periods of time. From the general characteristics of these sites, we would suggest that most of these scattered settlements are homesteads or hamlets comprised of groups of families which split off from major nucleated villages such as Upper Sanger and who dispersed to farm new land in high terraces upstream from the major nuclear villages. This model of expansion and homesteading can be expanded into the Garrison region to include less prominent village sites such as 32WI12 (Metcalf 1963b:40-45), perhaps some of the sites tested by Malouf (1951), and perhaps sites farther up the Missouri and lower Yellowstone in Montana such as Nollmeyer (Johnson 1982) and nearby locations. Space does not permit a full exploration of this subject in the present context.

In the following period (Late Scattered Village complex), the Bagnell site assumes paramount importance as a major population center, with Mandan Lake and Mahhaha being of lesser significance. No other sites in this period are known from the region, suggesting the degree of population collapse and restructuring of settlement dispersion that has occurred by this time. In the subsequent period, the Hensler site, by its size and pottery density, assumes a position of paramount importance. Sites of secondary significance include Lower Hidatsa and White Buffalo Robe. Smith Farm and Lower Sanger (and possibly Alderin Creek) may have been more briefly occupied settlements, perhaps brief intrusions into the region by downriver Mandans, judging by the presence of fortifications at each of these locations. After AD 1600 we are left

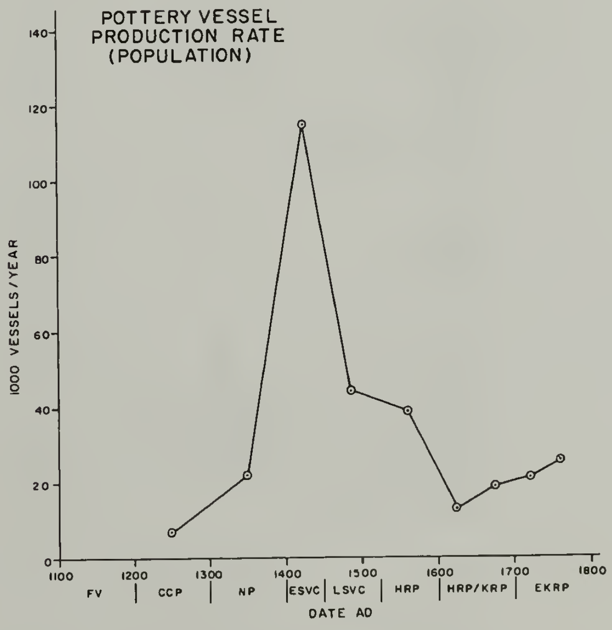

Figure 24.3. Graph of mean pottery vessel production/discard rate (population surrogate) in units of 1000 vessels per year, plotted according to time period in the upper Knife-Heart region.

Table 24.3. Data on estimated pottery vessel content in the studied village sites in the upper Knife-Heart region dating before AD 1780.

Time Period	Site	Site Area,ha	Excv. Vessels	Excv. Area,m^2	Density Vessels/m^2	Estimated Total Vessels in Site
10	Flaming Arrow	1.4	4	33.00	0.12	1,680
20	Clark's Creek	2.4	84	6.96	12.07	289,700
	Stiefel	3.2	-	-	(12.07)	386,300
	TOTAL, EXCAVATED		84	6.96	12.07	
	TOTAL, ALL SITES					676,000
30	Upper Sanger	2.0	42	5.20	8.08	161,500
	M.P. 28	0.5	100	6.96	14.37	71,800
	Cross Ranch	2.7	58	2.32	25.00	675,000
	Mahhaha	3.5	71	6.96	10.20	357,000
	Wh Buff Robe	2.8	-	-	(10.05)	281,400
	Amahami	2.3	-	-	(10.05)	231,200
	Buchfink	3.9	25	8.00	3.13	122,100
	Stanton Ferry	3.0	-	-	(10.05)	301,500
	TOTAL, EXCAVATED		296	29.44	10.05	
	TOTAL, ALL SITES					2,201,500
41	Pretty Point	8.1	108	6.96	15.52	1,257,100
	Upper Sanger	3.0	199	2.32	85.78	2,573,400
	Mandan Lake	3.5	95	11.60	8.19	286,700
	Shoreline	1.1	56	2.32	24.14	265,500
41 cont.	Mahhaha	3.5	128	6.96	18.39	643,700
	Lyman Aldren	2.8	-	-	(6.18)	173,000
	Big Hidatsa	0.8	7	2.0	3.50	28,000
	Poly	4.2	40	8.0	5.00	210,000
	Scovill	1.5	20	12.0	1.67	25,100
	Forkorner	7.0	101	46.0	2.20	154,000
	Hump	2.5	12	10.0	1.20	30,000
	Youess	3.2	75	28.0	2.68	85,800
	TOTAL, EXCAVATED		841	136.16	6.18	
	TOTAL, ALL SITES					5,732,300
42	Bagnell	3.9	127	2.32	54.74	2,134,900
	Mandan lake	3.5	256	11.60	22.07	772,500
	Mahhaha	3.5	78	6.96	11.21	392,400
	TOTAL, ALL SITES		461	20.88	22.08	3,299,800
50	Smith Farm	1.8	19	2.32	8.19	147,400
	Lower Sanger	1.6	84	6.96	12.07	193,100
	Hensler	4.0	157	4.64	33.84	1,353,600
	Alderin Creek	3.0	-	-	(18.43)	552,900
	Wh Buff Robe	2.0	-	-	(18.43)	368,600
	Lower Hidatsa	2.0	144	8.0	18.00	360,000
	TOTAL, EXCAVATED		404	21.92	18.43	
	TOTAL, ALL SITES					2,975,600
60	Mahhaha	3.5	126	6.96	18.10	633,500
61	Lower Hidatsa	2.0	97	8.00	12.13	242,600
	Big Hidatsa	2.4	24	10.00	2.40	57,600
	TOTAL, ALL SITES		121	18.00	6.72	300,200

Table 24.3. Concluded.

Time Period	Site	Site Area,ha	Excv. Vessels	Excv. Area,m²	Density Vessels/m²	Estimated Total Vessels in Site
62	Lower Hidatsa	2.0	159	8.00	19.88	397,600
	Big Hidatsa	3.2	92	14.00	6.57	210,200
	TOTAL, ALL SITES		251	22.00	11.40	607,800
70	Molander	1.8	106	4.64	22.84	411,100
	Mahhaha	3.5	47	6.96	6.75	236,300
	N Walker's Butte	0.5	-	-	data excluded	
	TOTAL, ALL SITES		153	11.60	13.19	647,400
71	Lower Hidatsa	2.0	87	8.00	10.88	217,600
	Big Hidatsa	4.1	127	14.00	9.07	371,900
	TOTAL, ALL SITES		214	22.00	9.73	589,500
72	Lower Hidatsa	2.0	77	8.00	9.63	192,600
	Big Hidatsa	5.2	174	16.00	10.88	565,800
	TOTAL, ALL SITES		251	24.00	10.46	758,400

Note: Parentheses denote estimated density values derived from sites in the same period with controlled excavation.

Table 24.4. Estimated pottery vessel production/disposal rate for all studied sites dating before AD 1780/90 in the upper Knife-Heart region.

Time Period	Total Vessels for Period (Table 24.3)	Period Duration	Adjustment	Vessels Produced Per Year
20	676,000	100 years		6,760
30	2,201,500	100 years		22,015
41	5,732,300	50 years		114,646
42	3,299,800	75 years		43,977
50	2,975,600	75 years		39,675
60	633,500	100 years		
61	300,200	50 years	add 316,750 from period 60 sample	12,339
62	607,800	50 years	add 316,750 from period 60 sample	18,491
70	647,400	85 years		
71	589,500	42.5 years	add 323,700 from period 70 sample	21,487
72	758,400	42.5 years	add 323,700 from period 70 sample	25,461

with two major settlements, at Lower Hidatsa and Big Hidatsa, with sizable settlements with possibly shorter duration occurring at Mahhaha, Molander, and Nightwalker's Butte. Through the subsequent century and a half, Lower Hidatsa gradually diminishes in significance, as Big Hidatsa seems to grow in importance. The latter may be largely attributable to the continuing amalgamation of semi-nomadic bands of Hidatsas-proper into the fold at Big Hidatsa under increasing pressures from warfare and pressures on hunting territories.

SUMMARY

Several significant points have been made in this chapter, and these can be briefly enumerated.

1. Architectural patterns change from oval to rectangular to circular during the period of study in the region; the timing of the change from rectangular to circular house form cannot be precisely established, but it may occur during the Heart River phase, AD 1525-1600. Early in time, at approximately AD 1300, there seems to be a shift from placement of houses in pits to construction on or near the existing surface. The *atuti* is an architectural feature used with both rectangular and circular house forms; its origin may derive from the pre-AD 1200, Formative Village period.

2. Site size exhibits a gradual and steady increase from before AD 1200 to about AD 1525; after that date, site size diminishes dramatically, partly in conjunction with the use of fortifications, and partly in response to drastically reduced regional population.

3. Settlements remain fairly dispersed in plan from before AD 1200 until approximately AD 1450. A process of significant settlement concentration seems to occur after AD 1450, and this coincides with a major (roughly 50 percent or more) decrease in regional population. Some settlements become fortified in the immediately following periods (after AD 1525), and settlements generally remain very compact from this time through the historic period.

4. Pottery density data are used to model population change in the period up to AD 1780. Major changes in population level have occurred through time in the region. Population increased steadily until a peak was reached in the period AD 1400-1450. The maximum rate of net increase may have been about 2.2 percent per year. A precipitous population decline appears to have begun in the last half of the AD 1400s and to have continued until about AD 1650. This population collapse can probably be attributed in part to the early epidemics proposed by Dobyns and Ramenofsky, but it seems to have begun to occur slightly prior to the first sustained Euroamerican contact in the hemisphere which began in AD 1492. The early phases of this population decline may reflect disease from other sources, out-migration to other regions, or warfare, all perhaps linked in some presently unknown way to climatic change and decreasing agricultural productivity in the region during this early period.

5. Overall, the population trends and settlement data suggest the following sequence of processes:

AD 1100-1200	establishment of initial village settlements;
AD 1200-1400	population growth and settlement dispersion within the region;
AD 1400-1450	rapid population growth accompanied by expansion and settlement of new territory upstream and outside the region;
AD 1450-1525	sudden population collapse and consolidation into a relatively small number of large, dense settlements;
AD 1525-1600	further collapse (probably due to disease) and consolidation into a few fortified settlements, accompanied by migration of peoples from the south into the region;
AD 1600-1650	further population collapse; migration of the first Hidatsas-proper into the region, and consolidation into only two dense settlements;
AD 1650-1780	gradual growth through consolidation of semi-nomadic bands at Big Hidatsa and migration of the Awaxawis into the region;

AD 1780-1837	further population collapse and settlement chaos after the 1780-1781 epidemic, followed by migration of Mandan refugees into the region, then by settlement reorganization;
AD 1837-1862	further population collapse and settlement chaos following the 1837 epidemic, migration of the Arikaras into the region; then reorganization, with all three tribal groups consolidating at a single settlement.

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CHAPTER 25

PLAINS VILLAGE CULTURAL TAXONOMY FOR THE UPPER KNIFE-HEART REGION

Stanley A. Ahler

INTRODUCTION

The purpose of this chapter is to provide a revised, working culture-historic or taxonomic framework for the Plains Village tradition archeological units in the upper Knife-Heart region of the Middle Missouri subarea. The placement of individual sites and site components which have been included in the present study will be described in relation to this taxonomic sequence. To the extent that the data base for the present study allows, this taxonomic framework will be extended into the adjacent lower Knife-Heart, Cannonball, and Garrison regions. This discussion draws heavily on the study of ceramic remains from the study sites, particularly the discussion of explanations for ceramic change in the upper Knife-Heart region (Chapter 17), and it also integrates data for lithic artifacts (Chapter 18), trade artifacts (Chapter 21), and architecture and settlement patterns (Chapter 24).

The taxonomic scheme which is presented here is clearly intended to be a working model, subject to refinement as research continues in the Middle Missouri subarea. It is felt that the regional culture-historic sequence can be presented in considerable detail and with considerable confidence, and an attempt is made to do that by naming and describing a continuous sequence of phases and their component content in the upper Knife-Heart region. Beyond the limits of the region, however, the taxonomic picture remains relatively unclear, pending much-needed investigation of extant sites and site collections from locations outside the region. For this reason, a somewhat general, higher level, integrative unit referred to here as the "complex" is used extensively to hint at the broad-scaled picture. Use of terms such as tradition, variant, and horizon is intentionally restricted. The author maintains an admitted bias against developing a broad-scale multiregional taxonomic synthesis in the absence of a well-controlled and well-dated record of material culture at the component and regional level.

Five sections follow in this chapter. The first includes a discussion and definition of the various unit terms used for the regional taxonomic sequence, such as component, phase, complex, and tradition. Following that is a discussion of the characteristics of the five complexes which have been defined in the study area and in immediately adjacent areas. These include the Charred Body, Middle Missouri, Painted Woods, Heart River, and Knife River complexes. The next section contains a discussion of the spatial, temporal, and content characteristics of the individual phases which are defined for the upper Knife-Heart region and an assignment of individual site components to various of these phases. In a brief section a revised culture-historic classification is listed for the 56 individual sites located within the KNRI. In the concluding section, the concept "ethnic tradition" is applied to the archeological record in the study area.

ARCHEOLOGICAL UNIT TERMS AND CONCEPTS

Temporal Units

The only temporal unit term which is specifically identified here is the "period." A period is any segment of time designated by another associated archeological unit term of any magnitude. To have meaning, the term "period" must be used in conjunction with a previously defined or identified archeological taxonomic unit name which has been identified on the basis of content. A period may be of any magnitude or duration, with the actual magnitude defined by the associated unit term. For example, we can speak of the Nailati period, extending from AD 1300 to AD 1400, because of its association with the Nailati phase; the Knife River period, extending from AD 1600 to AD 1886, because of its association with the Knife River complex; and the Plains Village period, extending from perhaps AD 1000 to AD 1886, because of its association with the Plains Village tradition. Used in this manner, the term period has no inherent analytic value but merely facilitates communication concerning the specific temporal parameters associated with a previously defined taxonomic unit.

Spatial Units

With minor modification, the scheme of spatial division suggested by Lehmer (1971:28-29) for the Plains area in general and for the Middle Missouri subarea of the Plains in particular is used in the present analysis. The Plains area is the largest spatial unit, this extending from Texas on the south into Alberta on the north and from the prairie/forest margin on the east (excluding the Prairie Peninsula which extends farther to the east) to the Rocky Mountains on the west. Five subareas are recognized within the Plains area, the Southern Plains, the Central Plains, the Northwestern Plains, the Middle Missouri, and the Northeastern Periphery (or Northeastern Plains; Schneider 1982:63; Anfinson 1982:67). Lehmer (1971:28) defined the Middle Missouri subarea as consisting of the Missouri River valley from just below the mouth of the White River in South Dakota to just above the Yellowstone River at the Montana/North Dakota border. Wedel (1961:156) extended the Middle Missouri a little farther downriver, to the South Dakota border. Lehmer (1971:29) suggested that the Middle Missouri subarea be subdivided into six smaller spatial units termed regions, from downstream to upstream, the Big Bend, Bad-Cheyenne, Grand-Moreau, Cannonball, Knife-Heart, and Garrison. The next smallest unit of spatial division within a region might be a locality (Willey and Phillips 1958:18), but Lehmer did not define such units for all regions, and localities have not been defined for the study area.

Several changes in region definitions within the Middle Missouri subarea are proposed here. Lehmer (1971:29) defined the Knife-Heart region as extending from below the Heart River to just above the mouth of the Knife River. The Knife-Heart region has subsequently (Wood, ed. 1986) been informally subdivided into two parts, the lower Knife-Heart region and the upper Knife-Heart region, which meet at about the location of Square Buttes near the Oliver-Morton County line in North Dakota. This informal subdivision of the Knife-Heart region has been followed throughout all previous chapters in this manuscript and throughout the archeological program at the KNRI. The present analysis and available data from various sources indicate that the archeological records within the respective lower and upper parts of the Knife-Heart region are quite distinct throughout much of the Plains Village period. This is particularly the case after the movement of ancestral Awatixa Hidatsa cultural groups into the upper subpart of the region which may have occurred as early as AD 1300. These two subregions in fact effectively demarcate the traditional homelands and territories of the various subgroups of the Hidatsas, claiming the upper Knife-Heart region, and the Mandans, claiming the lower Knife-Heart region. At various points in time there were strong interactions and actual village/group movements among the two tribes across this subregion boundary, but the dominant picture through a several hundred year period is that this spatial subdivision marked the point of juxtaposition of peoples belonging to two relatively distinct, major ethnic traditions.

On the basis of both the archeological data analysis available for the upper Knife-Heart region and the strength of the oral traditions, it is proposed here that the Knife-Heart region be redefined as two distinct spatial units both having equal status as regions. The *Knife region* is defined as extending from near the mouth of Miry Creek a short distance above the Knife River downstream to Square Buttes. The *Heart region* is defined as extending from Square Buttes on its upstream end to a short distance below the mouth of the Heart River.

It may eventually prove meaningful to redefine the size of the Heart region to include a larger area to the south presently within the Cannonball region. This could be done to effectively include all known components of the Terminal Middle Missouri variant, most directly relevant to early Mandan cultural development, within a single region. No formal redefinition of the spatial extent of the Cannonball region is proposed here, however, and consequently, the redefined Heart region to the north will for the time being remain relatively small in extent, extending from Square Buttes to just below the mouth of the Heart.

Two other new regions can be tentatively defined to further facilitate the discussion of cultural developments in the northern part of the Plains area. Both of these lie outside of Lehmer's original definition of the Middle Missouri subarea, but both contain a growing number of known sites clearly linked to Plains Village tradition cultural developments. One is the *Lower Yellowstone region* which includes the Yellowstone River valley from the mouth of the Powder River downstream to just below the confluence of the Missouri and the Yellowstone. Thus, the Lower Yellowstone region includes a small portion of the uppermost end of the Garrison region as originally defined by Lehmer (1971:29) as well as a long segment of the lower Yellowstone River valley. This region definition is based on 1) the presence of the Hagen site (24DW1; Mulloy 1942), the Nollmeyer site (24RL1225; Johnson 1982), and several other Plains Village-like sites reported to be in this region (Jeff Kinney, personal communication, 1983), and 2) the recognition from the present analysis and previous studies that these sites are closely linked to cultural groups and cultural developments well within the more traditionally defined Middle Missouri subarea.

The second new region is the *Little Missouri region* which is defined as encompassing all of the Little Missouri River valley in North Dakota. The rationale for the definition of the Little Missouri region is similar to that for the Lower Yellowstone region. Several ceramic-producing sites have recently been discovered and described in this region, among them Wilkins (Johnson 1983:9.28-9.45) and other sites with similar ceramics (M. Metcalf, personal communication to S. Ahler, 1986). Present evidence indicates that these are clearly Plains Village tradition in material culture, are probably horticulturally based settlements, and reflect close cultural linkages to sites well within the traditionally defined Middle Missouri subarea.

From the point of view of the study of Plains Village tradition archeology, it is useful to consider these latter two new regions as part of the Middle Missouri subarea. Such a consideration would effectively expand the geographic extent of the Middle Missouri subarea into two of the major tributary valleys of the Missouri River. Such an expansion is completely justified from the perspective of the theme of study of Plains Village tradition archeology in the Northern Plains, the physical continuity with previously defined regions of the Middle Missouri subarea, and oral traditions which link historic populations throughout this geographic territory. From the point of view of Plains Archaic tradition cultural development, an inclusion of these two regions within the Middle Missouri subarea may not make much sense. Subarea divisions of the Plains area will always be dependent upon the perspective of the researcher and the topic under study. Even so, the two regions may themselves have considerable environmental and geomorphic basis for their definition, regardless of the archeological period or complexes under investigation. These regional definitions may prove to be lasting and useful analytic devices, regardless of whether they are considered to be part of the respective Northwestern Plains or the Middle Missouri subareas.

Cultural Units

Several culture-historic or taxonomic unit terms can be defined and discussed for the study area, including the component, subphase, phase, complex, tradition, and ethnic tradition. Other unit terms, not proposed for use in the study area based on present knowledge, can also be discussed; these include tradition (in the sense used by Lehmer 1971), variant, and horizon.

Component

The component is the smallest unit of taxonomic study. The component consists of the remains from a single occupation or series of physically inseparable and stylistically indistinguishable occupations at a single site. This definition of component is in basic agreement with definitions by Willey and Phillips (1958:21-22) and Gregg (1985:71), as well as with common usage of the term in North American archeology. The component may represent use of the site by the same group or several related groups of people over an extended period of time, but stylistic variation in the material remains assigned to a component is not sufficient to detect ethnic heterogeneity in the artifact sample. In addition, the context (vertical or spatial stratification) of the artifact sample is insufficient to separate the sample into temporally discrete units of study.

The artifacts associated with a component are treated as though they were made and deposited contemporaneously. Such a group of artifacts constitutes an *assemblage* (Wood 1961:5). If the collection of artifacts from a site appears on the basis of stylistic or other analysis to constitute the remains of several components, reflecting different groups of people or a long period of occupation, and if these artifacts cannot be segregated and assigned to discrete components (assemblages), then the artifact collection is referred to as an *aggregate* (Wood 1961:5).

The component is thus bounded spatially by the limit of the site or some subarea within a site, and it is relatively restricted in the time dimension. In time duration, it may represent only a day or less of cultural activity, or it may extend across the full temporal extent of a phase, but it would never be more lengthy in temporal dimension than a phase. The actual content of a component varies according to the sample size and functional activities at the site. Regardless of this variation, stylistic variation within content is limited and shows no more variability than is permissible within a phase.

In the present study, the analytic batches are roughly equivalent to components. The term roughly equivalent is used because several analytic batches were initially defined on an exploratory basis to determine if significant stylistic variation could be detected between batches to justify separate analytical treatment. In cases where several analytic batches from a single site failed to exhibit such stylistic variation, and where vertical stratification of the batches was lacking, the batches were collapsed into a single analytic unit or component. For example, several analytic batches were defined for the Cross Ranch and Mile Post 28 sites based on spatial variation within the two adjacent sites (batches 13-16, Chapter 17 on ceramic analysis). When no significant stylistic difference was discovered among these batches, they were combined into a single unit for purposes of further analysis, and this unit can be thought of as a single component. In other instances, multiple analytic batches from a single site are defined by vertical stratigraphy. Even when stylistic differences cannot be demonstrated for these batches, considerable temporal depth can be assumed, and analytic separation is maintained. These batches are then treated as separate components. Examples of this occur for batches 46 and 47 at Lower Hidatsa Village which are stratigraphically separate but which have been assigned to the same phase (Willows phase). Similar examples occur at this site and at others with deeply stratified deposits (Big Hidatsa, Lower Hidatsa, Upper Sanger, etc.).

Phase

The phase is the next largest, well-recognized unit of study above the component, and it consists of a group of more than one component which shares a large number of content characteristics, which is generally spatially confined to a single region, and which is temporally confined to a relatively short time span. The definition of phase used here conforms closely to that of Willey and Phillips (1958:22). Usually, a phase is not defined on the basis of a single component, although the existence of a new phase may be posited based on the distinctiveness of the content in one component compared to other known components in the same or nearby regions (e.g., the Nailati phase as defined by Calabrese [1972]).

Willey and Phillips (1958:22) provide a fairly abstract and general definition of the content characteristics of a phase, requiring only that these traits be sufficiently distinct to distinguish the phase from all other units similarly conceived. Their definition is probably intentionally obscure in order to allow the phase concept to be applied in widely varying archeological settings. In the present study area, we can require that phases be defined on the basis of an extensive and close-knit array of commonly recurring ceramic attributes, and to a lesser extent, lithic attributes, and furthermore, that components in a phase share common traits dealing with architecture, settlement systems, and trade artifact content.

Willey and Phillips (1958:22) specify that a phase is spatially limited to a locality or region. In our study area, the term locality has not been used, so that specification is not appropriate. In addition, a phase as used here occasionally transcends a regional boundary and can occur in two adjacent regions. Such multiregional phases are so defined only when historic evidence or ethnographic analogy suggests that the components so assigned to a single phase could reasonably be attributed to a single group of people. While this usage permits occurrence of some multiregional phases, phases so defined still have logical spatial bounds and result in analytically meaningful units for purposes of comparative analysis. This usage of phase is far more spatially restrictive than that used by Reeves (1970) who applied virtually no spatial constraint to the phase concept.

There are no specific limits on the temporal duration of a phase, except that phases should be of shorter duration than the higher level integrative unit, tradition, which emphasizes temporal continuity in a region or area. In practical terms the temporal duration for any given phase is determined by the rapidity of change in key content characteristics in the components under investigation, taken in combination with the precision of temporal control available through chronometric dating, stratigraphy, and historical documentation. Phases in the posited regional sequence range from a minimum of approximately 50 years in duration to a maximum of approximately 100 years in duration.

Subphase

The subphase is not a formally defined taxonomic unit, but the concept has been applied as a convenient device in selected parts of the Middle Missouri subarea for purposes of organizing the components assigned to a single phase into two or more smaller subgroups thought to have cultural meaning. Lehmer identified two subphases of his Heart River phase and his Knife River phase in the Knife-Heart region (1971:203-206). In each instance, the intent was to subdivide components in each phase into those which were thought to be associated with respective Mandan (subphase 1 or I) and Hidatsa (subphase 2 or II) tribal units. With regard to the Heart River phase, this subdivision was based solely on the geographic location of sites considered with respect to traditional territories of the two tribal units. The separation was made at about the Oliver-Morton County line (equivalent to the present division point between the Knife and Heart regions). Downriver sites were assigned to Heart River 1 and were assumed from historic documentation to be Mandan villages. Upriver sites were Heart River 2 and most were assumed to be Hidatsa in origin. Lehmer made a similar distinction for components he assigned to the Knife River phase. In this instance, tribal associations for the two phases were based on first-hand historic documentation. This subphase division for the Knife River phase was followed in Lehmer et al. (1978:422-435) and by Wood (1986b:16-21).

While useful for interpretive purposes, this subphase classification of regional components will not be elaborated upon in the present study. Such distinctions, linked primarily to traditional and historic data concerning ethnic group affiliation, are emphasized in the present context through the development of ethnic traditions for the study area (see below).

Complex

A complex is defined here as a group of components which lies within a single cultural tradition and which exhibits a common dominant stylistic trait or a common set of recurring, nondominant stylistic traits or other traits, with such traits or trait complexes being sufficiently distinctive to distinguish the complex from all other similarly defined units. By dominant trait is meant a single typological group or stylistic variant or attribute state which constitutes the majority of all such occurrences in a component. The temporal and geographic limits of a complex are limited only by the requirement that all member components must belong to a common tradition; the actual temporal and spatial limits of a complex are determined by the range exhibited by member components. Time and space play no part in the definition of a complex.

This definition of complex is very similar to that used by Gregg (1985:73), except that Gregg requires the existence of a co-occurring set of traits, while here we allow a complex to be identified in some cases by the presence of a single dominant stylistic type or trait.

The term complex as used here is a higher level unit than a component and phase, but one which is defined on the basis of a very small series of material culture attributes which are thought to be particularly important for distinguishing subunits within a tradition from each other. Components, rather than phases, are grouped into complexes. Phases can be defined on the basis of a polythetic set of attributes, meaning that member components share the majority but not necessarily all of the defining characteristics. Because of the variability that may occur among components within a single phase, and because of the narrow range of specific stylistic attributes which define a complex, it is conceivable that individual components within a single phase may belong to different complexes. For example, both analytic batch 47 from Lower Hidatsa Village and batch 69 from Big Hidatsa Village are assigned to a common phase, the Willows phase, based on geographic position, temporal position, and common occurrence of substantive amounts of Le Beau S-Rim ware, Knife River ware, and Transitional ware pottery in both components. However, the Lower Hidatsa batch 47 can be assigned to the Heart River complex solely on the basis of predominate occurrence of Le Beau S-Rim ware (70 percent) among all pottery wares, and the Big Hidatsa batch 69 can be assigned to the Knife River complex solely on the basis of the predominate occurrence of the Knife River ware group (45 percent combined Knife River ware and Transitional ware).

The term complex is used differently here than by Syms (1977:70-71) who places narrow temporal limits on the complex as well as the requirement that the complex represent a single group of people, thereby having "cultural and historical validity." To Syms, the complex represents a group of people with a shared life style, shared toolkit, shared technological skills and preferences, and shared typological and technological attributes (p. 71). In essence, Syms' complex is simply a phase, as defined by Willey and Phillips, having a spatial expression much larger than a region. Complex, as used here, is very narrowly defined on the basis of a small number of shared stylistic or typological attributes. The implication is that a complex as used here can include multiple, culturally distinctive and ethnically distinctive groups of people, but groups which participated in a dominant stylistic expression or theme in a narrow range of material culture, a stylistic theme occurring across multiple regions and a large geographic area. Within the members of a complex, detailed comparative study may allow the definition of a core group of components and phases which represent the point of origin for the dominant stylistic theme which influenced all members in the group.

The term complex, as used here, is perhaps equivalent to the term "aggregate" as it is used by Schneider and Kinney (1978:35) to identify the Mortlach aggregate as a group of components bound together by a narrow range of ceramic attributes but lacking demonstrable temporal, spatial, or formal contiguity. Their use of the term aggregate is unfortunate, however, since they borrowed it from Wood (1961:5) but gave it a totally different meaning from that proposed by Wood who used it to characterize a potentially mixed or unassociated collection of artifacts from within a single site.

It should be made clear that the unit complex, defined without temporal and spatial considerations, is a decidedly less desirable unit term than some other integrative device such as variant or horizon which is based on temporal and spatial considerations. In this sense, complex is proposed for use in the Middle Missouri subarea and specifically in the study area only as a temporary and provisional unit term, sufficient to portray the dominant typological and stylistic linkages among components, but with the intent of eventually discarding such terms in favor of other unit terms more in keeping with Willey and Phillips' emphasis on space, time, and content. The transition from use of the term complex to use of some other term such as variant or horizon will occur when sufficiently detailed study occurs in multiple regions to justify definition of other unit terms. Presently, the archeological records in all regions outside the Knife region are so poorly known that the author feels unjustified in using any term other than complex to describe the overlying structure which may bind the regional sequences together.

Tradition

The term tradition has had widely varying usages in archeological taxonomy in general and in the Middle Missouri subarea. The single usage preferred here is in accordance with Goggin (1949:17, as cited in Lehmer and Caldwell 1966:513) who defines a tradition as a "distinctive way of life, reflected in various aspects of culture," and containing "persistent themes which dominate the life of the people." This definition emphasizes continuity in overall adaptive strategies and, potentially, a broad array of technological attributes which fit into that strategy. This usage is consistent with Willey's (1966:313) use of the concept tradition exemplified in his identification of the Plains Village tradition as one of four main cultural traditions in the Plains area. The Plains Village tradition, according to Willey (1966:313, 320), is characterized by a sedentary village lifeway based on dual subsistence pursuits of river valley horticulture and bison hunting. In his use of tradition, or "major cultural tradition," Willey (1966:4-5) explicitly emphasizes the presence of time depth and historical continuity within individual traditions, thereby using the concept as an integrative device with emphasis on temporal scope. Willey (1966:313) attributes the specific concept "Plains Village tradition" to Lehmer (1954a), but a reading of Lehmer suggests that Lehmer used the term "pattern" in place of Willey's term "tradition."

Lehmer, Caldwell, and other Middle Missouri archeologists (Lehmer 1954a, 1954b, 1971; Lehmer and Caldwell 1966; cf. Krause 1977) have used the term tradition in a distinctly different way. From the point of view of content, this involves a narrower definition for the term, centering around the repetitive occurrence of a relatively narrow range of technological attributes rather than a broad adaptive strategy. This usage of the term is consistent with one part of Willey and Phillips' (1958:37) definition of an archeological tradition as a "(primarily) temporal continuity represented by *persistent configurations in single technologies* or other systems of related forms" (emphasis added). On this basis, Lehmer has defined two additional traditions within the Middle Missouri subarea, these being the Middle Missouri tradition characterized by, above all else, rectangular house form, and the Coalescent tradition characterized by, above all else, a nonrectangular or circular house form.

These applications of the term tradition by Lehmer and others also differ in a significant way from the definition of tradition given by Willey and Phillips (1958:37), this being that Lehmer's traditions in fact exhibit greater continuity in space than continuity through time. Krause (1977) failed to recognize this important distinction between Willey and Phillips' definition of tradition and the manner in which Lehmer actually used the term. Both of

Lehmer's traditions have equally large and maximally extensive spatial limits, occurring throughout the entire Middle Missouri subarea. Also, throughout the subarea, the use of the rectangular house form (Middle Missouri tradition) can be demonstrated to occur earlier in the archeological record than use of the circular house form (Coalescent tradition). Furthermore, the entire Plains Village period in the subarea has relatively little time depth (circa 1,000 years), and the timing of transition from the rectangular house form to the circular form can be seen from available data to have occurred at approximately the same time throughout the subarea. When these facts are considered together, it becomes evident that Lehmer's usage of the term tradition is more in keeping with the concept of archeological *horizon*, which is an integrative unit which places emphasis on spatial continuity in material content rather than temporal continuity in content (Willey and Phillips 1958:33).

If we add to this situation the fact that historically distinct ethnic groups, such as the tribal unit recognized as the Mandans, exhibit a developmental sequence which can be traced through stages that involved the use of both rectangular and circular house forms (Wood 1967:117-144), then we have the curious and confusing instance of historically documented ethnic, social, and linguistic traditions which cross-cut Lehmer's archeological traditions. This seems to be an unnecessarily confused situation, deriving largely from peculiar usage by Lehmer of the term tradition to describe what are essentially spatially broad, developmental horizons or stages in the subarea archeological record.

In the present proposed revision of the cultural taxonomy for the Knife region, the concepts of Coalescent tradition and Middle Missouri tradition are not applied to the regional archeological record. The unit Plains Village tradition (as used by Willey 1966:313), applicable to and encompassing virtually all cultural units under study here, is retained in the present study. There are two reasons for abandoning the tradition terms and concepts used by Lehmer. The first lies in the above discussion which hopefully makes it clear that the choice of the term tradition is inappropriate for description of the phenomena under study. Another term should be used in place of tradition, one which places as great or greater emphasis on spatial continuity in content as on temporal continuity in content.

A second reason for abandoning Lehmer's use of the term tradition is that the archeological record as it is presently known for North Dakota appears to be quite different from the cultural record evident in South Dakota. In South Dakota the archeological entities which are assigned to the Middle Missouri and Coalescent traditions are in fact quite contrastive and distinct from each other, not only on the basis of architecture, but also on the basis of patterning in ceramic, bone, and lithic artifact classes (cf. Ahler 1977 and Johnson 1984 regarding lithic raw material patterns in the two traditions). Furthermore, the respective oral traditions of the Mandans and Arikaras suggest that the two archeological traditions can in fact be linked convincingly to historical development of the two respective distinct linguistic and ethnic groups. The contrasts between the two traditions, as expressed in South Dakota, are therefore not only supported by archeological data but also by historic and traditional data. In North Dakota this is not so. There is virtually no basis, other than changes in house form, for projecting the existence of the two South Dakota taxonomic units into North Dakota. Oral traditions as well as the archeological record argue convincingly for unbroken temporal continuity of resident populations throughout the Plains Village period in North Dakota. Positing the existence of temporally sequential distinct "traditions" only tends to obfuscate an already complex record of prehistoric and historic cultural development in North Dakota.

Ethnic Tradition

This is a new unit concept which is introduced here. This concept is used to describe the product of synthesis of all available data from oral traditions for resident cultural and ethnic groups with all other available data from the historical and archeological records. What emerges from this is a tracing of the historical development, through time and space, of the distinctive ethnic groups which can be identified in historic records. Multiple ethnic traditions may exist for a region, depending on the way in which the historically documented ethnic groups identified themselves and their ancestors and also based on data from the archeological record. Traditional data are given precedence in the reconstruction of ethnic traditions, but the ethnic traditions are provided substance and reality in time and space by integration of archeological data into the overall picture of cultural development.

The concept ethnic tradition is introduced here as a means for describing the end product of the meshing of significant bodies of data from the separate archeological and historical/ethnographic records. If these separate bodies of data are not integrated, we can be left with a very incomplete, sterile record of cultural development in the study area. The present study has convinced the author that oral traditions frequently contain a broad array of essentially accurate information on prehistoric cultural development extending surprisingly far back in time. Due primarily to historical accident, this body of information exists only selectively for certain historic cultural groups. Even where it does exist in historic and ethnographic records, it may remain completely out of reach and therefore useless until it can be unraveled and reconstructed by ethnographers, cultural anthropologists, and ethnohistorians using a wide variety of tools normally outside the grasp of the archeologist. We are fortunate in having available to us the fruits of Bowers' efforts (1948, 1965) concerning the traditional histories of the Hidatsa subgroups—cultural groups who happened to be the central players in the prehistoric record under investigation here.

Few rules can be developed for defining the spatial, temporal, and content makeup or boundaries of ethnic traditions. The end product can consist of a type of tree diagram in which the vertical dimension is time and the horizontal dimension is space, reflecting the migrations of populations into and out of the area and mergings and separations of distinct ethnic groups. Such a tree diagram can be overlain upon the regional or multiregional archeological taxonomy consisting of components, phases, complexes, and other defined integrative units, to assist in clarifying the relationship between ethnic unit development and material remains. Alternately, the end product of ethnic tradition development could be expressed as a series of maps tracking the movement of ethnic groups through space and time, with appropriate labeling to provide data on the temporal dimension and relevant archeological component and unit terms (cf. Bowers 1948:Figure 22).

Horizon and Variant

Two other important unit terms have been applied to the taxonomy of the Middle Missouri subarea, these being the horizon and the variant. The use of both terms is grounded in Lehmer's particular application of the term tradition, which, it has been noted, is a unit signifying modest time depth but maximal spatial extent within the subarea. The intent in the use of both terms has been to provide an integrative unit which is intermediate in space, time, and content between the phase and the tradition as used by Lehmer. Horizon was defined (Lehmer and Caldwell 1966:515) as a subdivision of a tradition which includes two or more approximately coeval phases which share traits indicating that they are manifestations of the same basic cultural complex. However, having departed from Willey and Phillips' definition of tradition and having already identified traditions for the Middle Missouri subarea which have the maximal spatial expression possible in the subarea, Lehmer found it awkward to use the term horizon, in the sense proposed by Willey and Phillips (1958), as a unit emphasizing the spatial dimension over the temporal dimension.

In response to this difficulty, Lehmer in 1971 replaced the term horizon with the term variant which he defined as an "expression of a cultural tradition which has a greater order of magnitude than a phase and which is distinguished from other variants of the same tradition by its geographical distribution, age, and/or cultural content" (Lehmer 1971:32). Feeling that this definition did not clearly express Lehmer's use of the term variant, Krause (1977:10) has since redefined Lehmer's variant as a "mid-range taxon which has less content, greater time span, and greater spatial spread than a phase, but less time span than a tradition and less spatial spread than a horizon" (with Krause using tradition and horizon as defined in Willey and Phillips rather than as used by Lehmer).

Neither of these terms, variant or horizon, is used in the present cultural taxonomy for the Knife region. The primary reason for this is because each term signifies, or can be assumed to signify, a subdivision of some larger unit, larger than the phase, but smaller than the all-encompassing Plains Village cultural tradition. Because these larger units have not been defined for the study area, and because this author feels the existing traditions defined by Lehmer are inappropriate for the study area, it is impossible to define subdivisions of larger units which are presently undefined. For the time being, the provisional unit, complex, will be used as the only intermediate level integrative device. When the cultural records in adjacent regions are studied in detail, larger-scale integrative units such as variant, horizon, and tradition which encompass multiregional spatial areas can be defined.

COMPLEX DEFINITIONS

Five complexes are recognized in the Knife region. From oldest to most recent, these are the Charred Body, Middle Missouri, Painted Woods, Heart River, and Knife River complexes. Figure 25.1 illustrates the temporal and spatial arrangement of these complexes in the Knife and adjacent regions, based on spatial location and associated dates for various components which can be assigned with confidence to these complexes. The key, definitional attributes for each complex will be discussed, as will other aspects of the rationale for recognition of various units and the general cultural content of each complex.

Charred Body Complex

The key attributes for the Charred Body complex are the following:

1. Pottery with predominantly (greater than 50 percent) cord-roughened surface treatment in body sherds.

2. Use of oval-shaped, semisubterranean dwellings.

A single component in the Knife region can be definitely assigned to the Charred Body complex, this being that at Flaming Arrow. Several components on the Cross Ranch classified as Late Woodland may reflect settlement facies of village groups who resided part of the year at sites such as Flaming Arrow. Architectural data are lacking for the Cross Ranch components, and they therefore cannot be assigned to this complex. The other known component which can be assigned with confidence to this complex is Menoken, located on Apple Creek in the Heart region. Thus, the Charred Body complex has weak expressions in both the Knife and Heart regions. Only the Flaming Arrow component has been dated radiometrically, the samples there showing a central tendency of circa AD 1100. When additional dates become available from other components in this complex, they are expected to be of this age or one or two centuries earlier. Insufficient data exist for definition of any phases reflecting regional expressions of this complex.

The complex is defined to include village-dwelling cultural groups whose material culture seems to lie at the beginning end of the Plains Village tradition developmental sequence in the subarea and adjacent areas. It is unclear if all groups assigned to this complex actively practiced horticulture. Evidence of storage facilities is presently lacking at both of the components assigned to this complex. The Flaming Arrow excavated sample is small and has not been fully studied nor reported; Hoffman's (1982) reassessment of the Menoken excavated sample revealed a general material content not inconsistent with the proposed early placement of Menoken in the regional cultural sequence.

Middle Missouri Complex

The key attributes for the Middle Missouri complex are the following:

1. Pottery body sherds in which simple-stamping is the predominant surface treatment and in which less than 5 percent of the body sherds exhibit check-stamped surface treatment.

2. Pottery rim sherds in which combined Fort Yates ware and Riggs ware account for 67 percent or more of the collection.

The intent here is to identify a complex which is analogous in key material content to Lehmer's (1971) Extended variant of the Middle Missouri tradition which has a wide-spread expression throughout many contiguous regions in the Middle Missouri subarea, including a clear but spotty expression in the Knife region. The name Middle Missouri complex is chosen both to signify the acknowledged relationship between this taxonomic unit and the Middle Missouri tradition as defined by Lehmer, and also to signify the author's impression that this complex denotes some of the oldest and most central components in Plains Village cultural development within the subarea.

The noted key ceramic attributes serve to distinguish this unit from all other complexes having expression in the Knife region. A large number of additional elements of distinctive cultural content might be added to this list, but knowledge of those elements derives largely from components which lie outside of the study area. Such attributes might include semisubterranean, rectangular dwelling structures, house entryways consistently opening to the southwest, and a community plan in which houses are arranged in multiple parallel rows.

The Middle Missouri complex has a clear expression in both the Stiefel and Clark's Creek components within the Knife region. Two additional components, at the PG site and Grandmother's Lodge, can also probably be assigned to this complex, although small ceramic samples from each of the latter components preclude any clearcut complex assignment. Two of the four noted components have been dated in the latter part of the thirteenth century, and all have been assigned to the Clark's Creek phase. Thus, within the Knife region and the Garrison region, it is likely that the Middle Missouri complex has a temporal expression equivalent to that estimated for the Clark's Creek phase, circa AD 1200-1300.

The Middle Missouri complex is well represented in the Cannonball region by a relatively large number of studied components, including Helb, Jake White Bull, Bendish, South Cannonball, Paul Brave, Fire Heart Creek (early component), and Havens. Most of these are assignable to the Fort Yates phase (Lehmer 1966:56-63), and virtually all have been radiocarbon dated in the period AD 1000 to 1300 (Thiessen 1977). From the range of dates, it

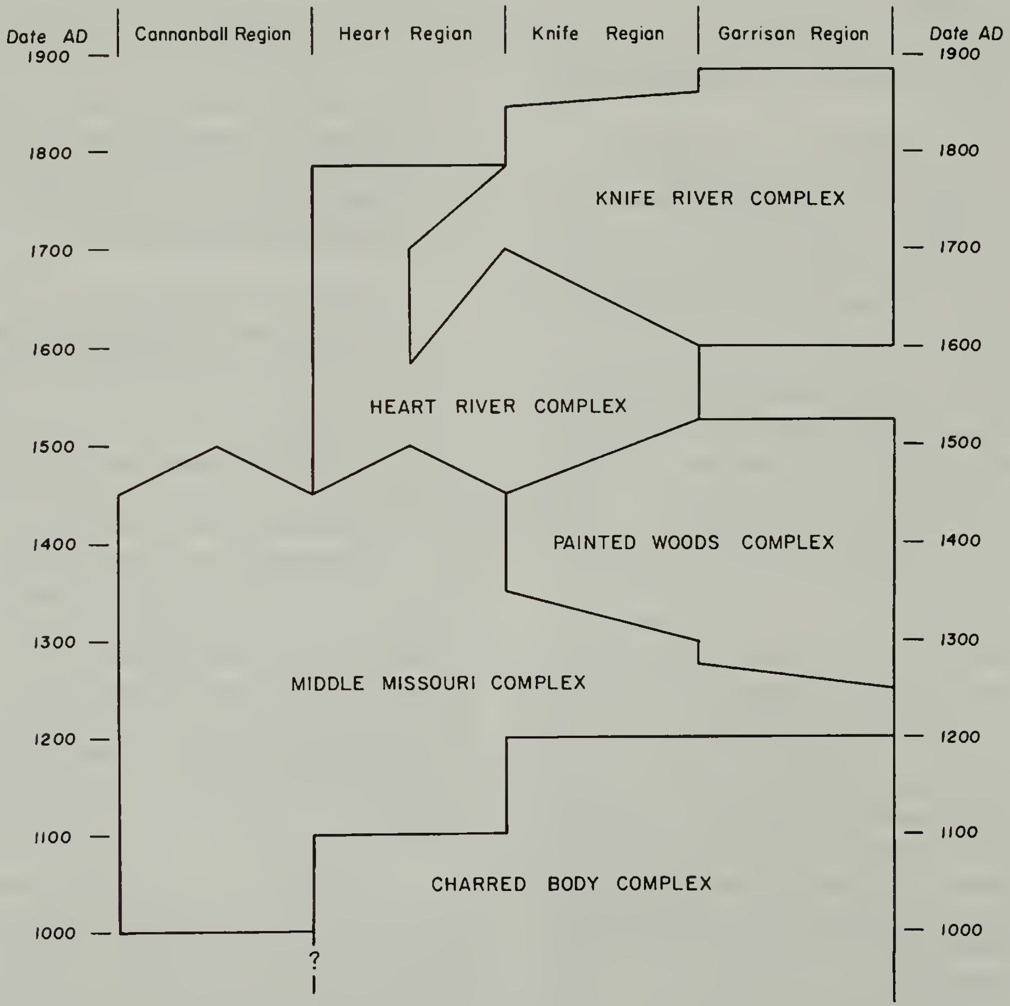


Figure 25.1. Space-time diagram showing the spatial and temporal extent of the five cultural complexes defined for Plains Village tradition archeological components in the Knife region and adjacent regions in North Dakota. Boundaries of cultural complexes shown as diagonal lines reflect indistinct temporal subdivisions, sometimes falling within a single phase period, or transitional changes between sequential complexes.

appears that the Middle Missouri complex has an earlier and more lengthy temporal expression in the Cannonball region than in the Knife and Garrison regions. No known components in the Heart region can be assigned to the Middle Missouri complex, but then, virtually no sites in that region have been studied using modern archeological techniques. The assumption, expressed in Figure 25.1, is that the Middle Missouri complex will eventually be recognized at multiple components in the Heart region.

The similarity between the Middle Missouri complex and Lehmer's Extended variant of the Middle Missouri tradition has been noted. It is presently unclear if components classifiable in Lehmer's Terminal variant of the Middle Missouri tradition should be assigned to this complex or to some other complex uniquely expressive of the content of those sites. Only two such sites, both in the upper reaches of the Cannonball region (Huff and Shermer), have been studied. These components are thought to date in the general period AD 1300 to 1500. Based on the published data concerning the material content of these two components, it is clear to the author that these components should not be included in the coeval Scattered Village complex which supersedes the Middle Missouri complex in the Knife region and probably in the Garrison region.

Painted Woods Complex

The key attributes for the Painted Woods complex are the following:

1. Pottery collections in which fewer than 50 percent of the vessels are classified as Le Beau S-Rim ware (as defined in Wood 1967:67-68 and as used in Ahler and Swenson 1985b and this volume).

2. Pottery rim sherds in which combined occurrences of trailed/incised and stab-and-drag decorative types constitute more than 5 percent of all decorative type occurrences.

3. Pottery rim sherds in which combined occurrences of flat, T-shaped, and L-shaped lip forms constitute 25 percent or more of all lip form occurrences.

4. Pottery body sherd samples in which 5 percent or more exhibit check-stamped surface treatment.

To be included in this complex, a component must exhibit attribute (1) and must also exhibit two of the three characteristics noted in attributes (2), (3), and (4).

The name for this complex, Painted Woods, is taken from the Painted Woods locality or district which comprises the Missouri valley near and just upstream from Square Buttes. The name also derives from Bowers' (1948; 1965) definition of a Painted Woods focus which is strongly expressed in this part of the region. There is a strong similarity in the underlying material attributes signifying both Bowers' focus and this complex, and nearly all of the components assigned by Bowers to the Painted Woods focus are herein assigned to the present complex.

This complex is somewhat difficult to define, hence the polythetic definition based on several ceramic characteristics. Whereas most of the other complexes defined for the study area are based on dominant pottery ware occurrences, pottery wares vary widely within this complex, and this complex is identified on the basis of what might be considered relatively minor ceramic form, decorative, and surface treatment attributes. Yet these are precisely the material traits which bind this group together and which can be used most directly to contrast this complex with other complexes having expressions in the region. The one ware attribute (1, low frequency Le Beau S-Rim ware) serves to distinguish this complex from the later Heart River complex, while the other ceramic attributes distinguish this complex primarily from the earlier and contemporaneous Middle Missouri complex.

The majority of components assigned to three phases are considered as expressions of this complex, these being, in chronological order, the Nailati phase, Scattered Village phase, and Mandan Lake phase. All of these components and the complex itself have in common a wide array of multiple pottery ware groups consisting of both straight rim and S-rim forms (wares occurring frequently include Riggs, Fort Yates, Unnamed S-Rim, Unnamed Straight Rim, and Le Beau S-Rim). Ware group frequencies vary considerably from site to site. Decorative types are very heterogeneous at any point in time, with cord-impression, finger modeling, and tool-impression being well represented, but with several other decorative variants also represented, and with several decorative types occurring on both S-rim and straight rim vessel forms. These features of rim form heterogeneity and decorative technique heterogeneity are consistent across the components in this complex and serve to contrast this complex with all others defined in the region. Underlying this heterogeneity is consistent occurrence of check-stamped surface treatment, extensive lip modeling, and the noted parallel trailed/incised or stab-and-drag decorative techniques.

It is the author's clear impression that the Painted Woods complex represents an amalgamation of stylistic influences from many farflung corners of the Northern Plains. The occurrence of trailed/incised/stab-and-drag decorative techniques seems to link this complex with village components assigned to Lehmer's (1971) Extended variant of the Coalescent tradition in South Dakota, where these decorative elements dominate the ceramic assemblages. In contrast, check-stamped surface treatment occurs primarily in more northerly sites, many of which are outside of the Middle Missouri subarea proper. Check-stamping has its greatest frequency in several Nailati phase components, in the earliest part of this complex in the region, where check-stamping is often the dominant treatment pattern. One gains the impression that ceramic assemblages in this complex document a persistent pattern of both population movement as well as free exchange of ideas from many different sources and directions, a process in which no single source of influence becomes dominant within the duration of the complex.

A dispersed settlement pattern and community plan seem to characterize most of the components assigned to the Painted Woods complex, although this is not necessarily a characteristic unique to the complex. None of the villages in this complex are known to have been fortified. In many Nailati phase and Scattered Village phase components, settlements are relatively small and midden deposits are generally not deep. In the Scattered Village phase a small number of sites with deep middens occur (e.g., Upper Sanger), but for each of these apparent population centers there are several briefly occupied sites with little surficial evidence of house features or midden piles. This dispersed settlement pattern, consisting perhaps of small hamlets or homesteads or homestead groups, is most evident in the intensively surveyed area in the southern part of the KNRI at the Hump, Youess, Forkorner, and other sites. It is thought that many sites of this nature, and probably of this temporal period, exist in the Knife region and perhaps in the Garrison and other regions, having so far gone undetected due to a lack of survey and their low visibility. Two such examples may be the Levis site (32OL423) and the Haystack site (32OL422) on the Cross Ranch which have not been test excavated. The latest components assigned to this complex seem to reflect a dramatic change in settlement pattern. The settlements of this age are few and relatively large, and it appears that a process of amalgamation, aggregation into larger communities, and perhaps population collapse occurred at this time.

A number of components outside the Knife region can probably be assigned to the Painted Woods complex. Historical and cultural connections implied by such assignments are probably real, and reflect geographically widespread communication as well as actual population movements during the particular time when the complex was expressed in the Northern Plains. Among such probable Painted Woods complex inclusions are the Schultz site, or at least some component at that site, on the Sheyenne River in eastern North Dakota (cf. Bowers 1948; 1965:213, 479-480, 483; Wood 1963); possibly some component or components at sites 32ME43 and 32ME54 in the Garrison region (Malouf 1951); probably site 32WI12 in the upper Garrison region in Williams County, North Dakota (Metcalf 1963b); possibly some components in the later village zone at the Mondrian Tree site in the Lower Yellowstone region (Toom and Gregg 1983; Johnson 1983, although check-stamped surface treatment seems to be absent at the site); probably the Wilkins site (32SL7) in Slope County, North Dakota, in the Little Missouri region (Johnson 1983); probably the Nollmeyer site (24RL1225) in the Lower Yellowstone region (Johnson 1982); and probably the Hagen site (24DW1) in the Lower Yellowstone region in Montana (Mulloy 1942).

Heart River Complex

The key attribute for the Heart River complex is the following:

> 1. A pottery rim sherd collection in which 50 percent or more are classified as Le Beau S-Rim ware (as defined by Wood 1967:67-68 and as used in Ahler and Swenson 1985b and in this volume).

The Heart River complex can be thought of as signifying the florescence of the Mandan culture during the latter half of the Plains Village period in the subarea. This florescence is particularly well expressed at several traditional Mandan sites in the Heart region, but sites expressing this complex extend throughout the Knife region and perhaps into surrounding areas as well. Le Beau ware is the most prominent material marker for this florescence, with the ware dominating virtually all component assemblages in this complex, and with the ware differing from one region or period to another only in minor details of form and decoration.

In the Knife region at least one component which can be classified in this complex appears in the Mandan Lake phase (Mandan Lake batch 23), while all components placed in the following Hensler phase are classified in the Heart River complex. In the following Willows phase, only components in the intermediate levels at Lower Hidatsa Village (batches 46, 47, and 56) can be assigned to this complex. Thus, in the Knife region, the Heart River complex begins to appear sometime after AD 1450, dominates the region in the period AD 1525 to 1600, and then diminishes and disappears by AD 1700. In the Knife region, the appearance of the Heart River complex is thought to signify the brief but pervasive influence of the Mandan ceramic tradition on local resident Awatixa Hidatsa pottery makers.

The Heart region is the geographic center of the Heart River complex. It is thought that virtually all village components in that region which date after about AD 1450/1500 and up until the time of abandonment of the region by the Mandans circa AD 1780 will eventually be assigned to the Heart River complex. Almost no components in that region have been rigorously studied, and only the two components at Slant Village can presently be assigned to the complex based on quantitative, stratigraphically controlled data.

The posited 330-year duration for the complex in the Heart region is the primary reason that the term "Heart River" has been removed from the level of phase and has been assigned to the more encompassing integrative unit, the complex. Another reason is the geographic spread of the complex, extending through at least two regions traditionally occupied by historically distinct ethnic groups. The name "Heart River" is retained for the complex, because the complex is best exemplified by the ceramic traits considered to be central to the Heart River phase, as the phase was originally defined by Lehmer (1971:203-205). With further investigation, a number of discrete phases assigned to the Heart River complex will eventually be identified in the Heart region. Following the usage of Lehmer, the term "Heart River phase" has previously been applied to the primary expressions of this complex in the Knife region, dating from AD 1525 to 1600. That taxonomic unit, most representative of the complex in the Knife region, has been renamed herein the Hensler phase, after the Hensler site which contains one of the most prominent villages belonging to the complex.

Knife River Complex

The key attributes for the Knife River complex are the following:

1. A pottery rim collection in which the combined frequency of Knife River ware, Deapolis Collared ware (both defined in Lehmer et al. 1978:190-199, 208-209) and Transitional ware (described in Ahler and Weston 1981:81-86 and Ahler and Swenson 1985b) is greater than the frequency of any other single ware group.

The pottery wares noted here as key elements in the Knife River complex all appear relatively late in time and usually co-occur as companion wares. Knife River ware is always the most common regardless of temporal position; the other two wares always constitute minority groups, with Transitional ware tending to occur earlier than Deapolis ware in the regional sequence. This complex is named the Knife River complex to signify the central role that Knife River ware plays in its definition, and also to signify that the geographic center of the complex seems to lie near the mouth of the Knife River.

As defined here and with reference to both the Knife and Garrison regions, the Knife River complex subsumes some components previously assigned to the Heart River phase/Knife River phase transition period (circa AD 1600-1700; now termed the Willows phase), and all components previously assigned to the Early Knife River phase (circa AD 1700-1780/90; now termed the Minnetaree phase) and the Late Knife River phase (postdating AD 1780/90; now included within the Roadmaker and Four Bears phases). Components of this complex which date relatively early in time are found primarily in the Knife region, while several later components occur in the Garrison region.

The existence and distribution of this complex directly reflect the migration of the eastern Hidatsa-proper and Awaxawi subgroups into the Middle Missouri subarea from places to the east. These ethnic groups are thought to have brought with them a distinctive ceramic tradition, best reflected in Knife River ware and the minority companion wares which signify this complex. The dominance of these wares in the ceramic record signifies the presence of one or both of these ethnic groups or the influence of these groups on local resident Awatixa Hidatsa and Mandan populations.

Based on oral traditions, the author would predict the existence of components assignable to the Knife River complex in the Heart region, these being specifically the traditional settlements of the Hidatsas-proper and the Awaxawis who settled very near the Mandans prior to their movement into the Knife region. None of the traditional Mandan settlements in the Heart region are known to contain ceramic assemblages assignable to this complex, although the Mandan settlements established in the Knife region after their exodus from the Heart region in the late AD 1700s can readily be assigned to the complex. The remaining components assigned to the Knife River complex in the Knife and Garrison regions can, on the basis of oral traditions, be readily attributed to one or more of the three subgroups of the Hidatsas.

PHASE DEFINITIONS

The Plains Village tradition cultural sequence in the Knife region has been organized into a total of nine archeological phases. Figure 25.2 illustrates the temporal sequence of these phases and their geographic distributions. Certain phases, particularly the latest three, have geographic distributions extending through both the Knife region and the adjacent Garrison region. For the most part, though, the Plains Village cultural sequence in the Garrison region remains undefined, due primarily to a lack of work at sites inundated beneath the Garrison Reservoir other than at the prominent, historic period villages. In the Knife region, the phase sequence begins with the Clark's Creek phase, estimated to initiate at circa AD 1200. Earlier sedentary village-like settlements are known to occur, for example at Flaming Arrow (32ML4), but data on such components are insufficient to justify formal phase definitions for any components preceding the Clark's Creek phase.

As can be noted in Figure 25.2, no named archeological phases are shown for the lower Knife-Heart or Heart region, centered on the mouth of the Heart River. This is despite Lehmer's (1971:203-205) definition of the Heart River phase in this part of the Missouri valley. The "Heart River phase," as originally defined by Lehmer for the Heart region, has here been re-identified as the Heart River complex. Existing evidence suggests that the Heart River complex in the Heart region will eventually be broken into several discrete phases. If one is interested in the question of Mandan cultural development, the significance of the data vacuum for Plains Village sites in the Heart region cannot be overemphasized.

Two phase names are noted on Figure 25.2 for the Cannonball region, these being the Fort Yates phase and the Huff phase. The Fort Yates phase was first defined by Lehmer (1966:56-63) as extending geographically from the Cannonball region upstream to the Knife River. Potential Fort Yates components in the Knife region have subsequently been redefined as part of the Clark's Creek phase (Calabrese 1972; Wood 1986b:7-11). The term Huff phase is taken from Wood's definition of the Huff focus (1967:100-116) in the Cannonball region. It is presently unclear if either of these phases have components in the Heart region, although it would be logical to assume so. The dates for these phases in the Cannonball region suggested in Figure 25.2 are based on Thiessen's (1977) synopsis which indicates that the majority of the Fort Yates phase components can be dated by radiocarbon to the period AD 1000-1300, as well as a new corrected calendrical mean date (via Stuiver 1982) for the Huff site of circa AD 1425 based on raw dates given in Thiessen (1977:77). Lying beyond the scope of the present study, neither the Fort Yates phase nor the Huff phase will be described herein.

A brief topical description of each of the nine phases present in the Knife region will be given. Virtually all of these phases have been previously discussed in this report, but often by another unit name and/or with reference to an associated regional time period designation. Table 25.1 provides a listing of all known components in the Knife and Garrison regions which can be assigned to the defined phases. This list is thought to include all of the known, relatively prominent Plains Village sedentary settlements in the two regions. It also includes many Late Woodland period or Charred Body complex components and several general Plains Village tradition, nonsedentary settlement components in the two regions, many of which are presently unassigned to phase. The list of nonsedentary settlements is not exhaustive, but it does reflect the results of two major survey efforts in the region on the Cross Ranch (Weston et al. 1980) and in the KNRI (Lovick and Ahler 1982). Components with uncertain but probable phase designations are preceded by a question mark, "?". In the text that follows, only the sedentary village sites are listed as component examples for each phase; the reader may refer to Table 25.1 for a more complete list of all probable components within any phase.

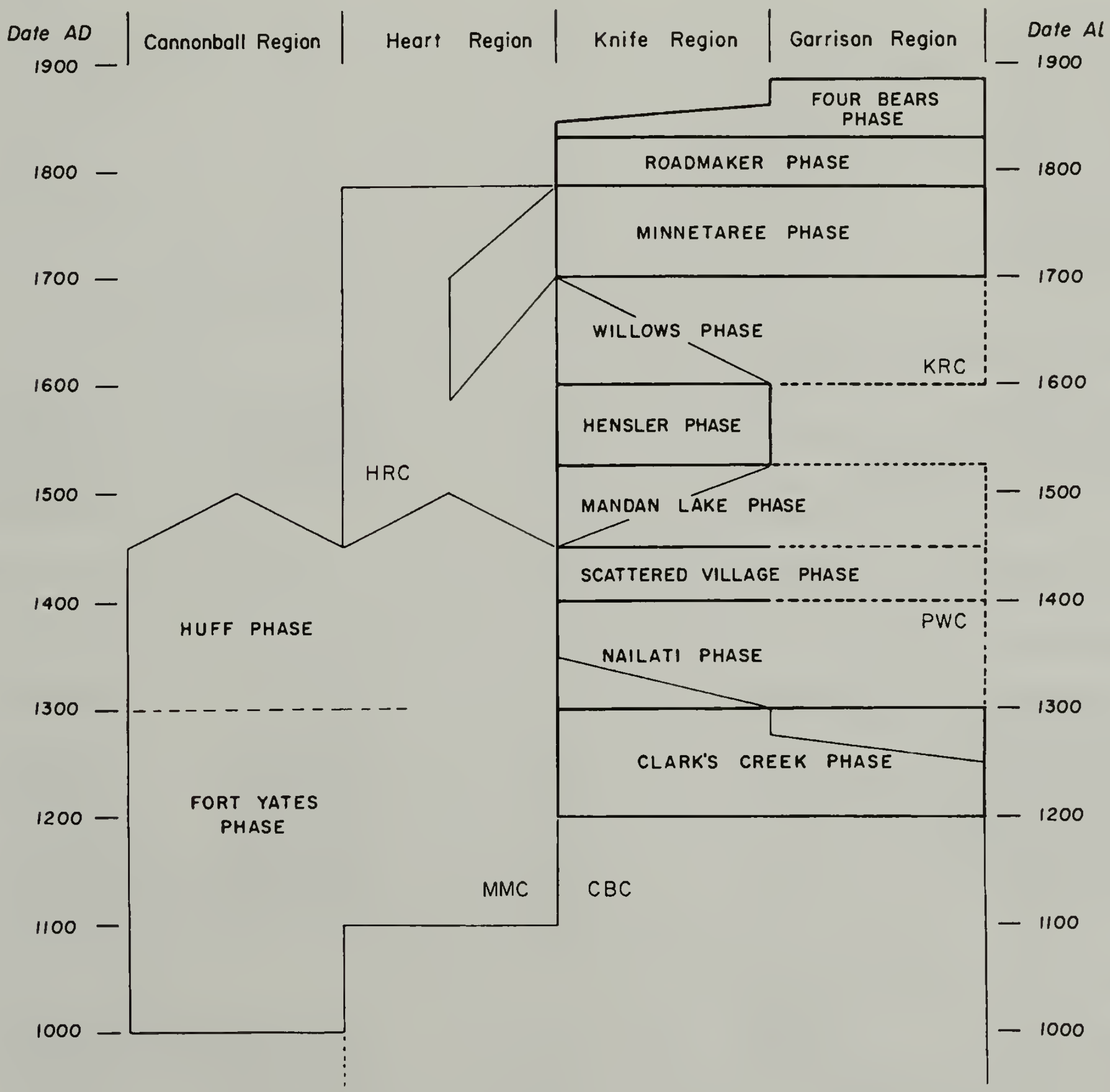


Figure 25.2. Space-time diagram showing the cultural sequence of nine phases defined for Plains Village tradition archeological components in the Knife region and adjacent areas in North Dakota. This phase sequence is superimposed on the structure of cultural complexes for the same geographic area shown in Figure 25.1.

Table 25.1. Summary of phase, complex, and ethnic tradition assignments for archeological components in the Knife and Garrison regions, organized by phase within the regional chronological sequence.

Component (Site or Subsite Sample)	Batch Numbers Studied Herein	Complex	Ethnic Tradition
UNASSIGNED TO PHASE. CHARRED BODY COMPLEX AND LATE WOODLAND PERIOD.			
Flaming Arrow (32ML4)	92	Charred Body	Awatixa
Lost Patrol (32OL28)	-	?	?
Frosty (32OL32)	-	?	?
Loaf (32OL42)	-	?	?
Roscoe (32OL45)	-	?	?
Duchess (32OL132)	-	?	?
PG (32OL148), Late Woodland component	-	?	?
Robin (32OL156)	99	?	?
Emery (32OL158)	-	?	?
Bundlemaker (32OL159), Late Woodland comp	99	?	?
Stoney (32OL161)	99	?	?
Shide (32OL162)	99	?	?
Hat (32OL177)	99	?	?
Legacy (32OL252)	99	?	?
Carroll (32OL253)	99	?	?
CLARK'S CREEK PHASE. AD 1200-1300.			
Clark's Creek (32ME1)	34	Middle Missouri	N. Mandan
Stiefel (32ME202)	81	Middle Missouri	N. Mandan
PG (32OL148) (main component)	96	Middle Missouri	N. Mandan
Grandmother's Lodge (32ME59)	84	Middle Missouri	?N. Mandan ?Awatixa
?Sagehorn (32ME101)	100	?	?
NAILATI PHASE. AD 1300-1400.			
Upper Sanger (32OL12), time period 4	11,12*	Painted Woods	Awatixa
Cross Ranch (32OL14) (and Mile Post 28, 32OL13)	13-17	Painted Woods	Awatixa
Mahhaha (32OL22), time period 5	33	Painted Woods	Awatixa
White Buffalo Robe (32ME7), early	40	Painted Woods	Awatixa
Amahami (32ME8), early	42	Painted Woods	Awatixa
Buchfink (32ME9), main component	43	Painted Woods	Awatixa
Stanton Ferry (32ML6)	72	Painted Woods	Awatixa
Angus (32OL144)	95	Painted Woods	Awatixa
SCATTERED VILLAGE PHASE. AD 1400-1450.			
Pretty Point (32OL10)	5	Painted Woods	Awatixa
Upper Sanger (32OL12), time periods 1-3	8-10,12*	Painted Woods	Awatixa
Mandan Lake (32OL21), time periods 2,3	26,27	Painted Woods	Awatixa
Mahhaha (32OL22), time period 4	32	Painted Woods	Awatixa
Lyman Aldren (32ME3)	36	Painted Woods	?Awigaxa
Big Hidatsa (32ME12), time period 7	70	Painted Woods	Awatixa
Poly (32ME407)	73	Painted Woods	Awatixa
Scovill (32ME409)	75	Painted Woods	Awatixa
Forkorner (32ME413), east	77	Painted Woods	Awatixa

Table 25.1. Continued.

Component (Site or Subsite Sample)	Batch Numbers Studied Herein	Complex	Ethnic Tradition
SCATTERED VILLAGE PHASE. AD 1400-1450. Continued.			
Forkorner (32ME413), west	78	Painted Woods	Awatixa
Hump (32ME414)	79	Painted Woods	Awatixa
Youess (32ME415)	80	Painted Woods	Awatixa
?Bagnell (32OL14), early (?) component	18*	Painted Woods	Awatixa
?Shoreline (32OL103)	28	?	Awatixa
?Taylor Bluff (32ME366), early	95	Painted Woods	Awatixa
?Running Deer (32ME383)	98*	Painted Woods	Awatixa
?Black Owl (32ME311)	-	Painted Woods	Awatixa
?Madman's Bluff (32ME312)	-	Painted Woods	Awatixa
?YCC (32ME410)	-	Painted Woods	Awatixa
?Elder (32ME416)	-	Painted Woods	Awatixa
?Yellow Bear (32ME464)	-	Painted Woods	Awatixa
?Lower Hidatsa East (32ME487)	-	Painted Woods	Awatixa
MANDAN LAKE PHASE. AD 1450-1525.			
Mandan Lake (32OL21), test 1, time period 1	23	Heart River	Awatixa
Mandan Lake (32OL21), test 3 time period 1	24	Painted Woods	Awatixa
Mandan Lake (32OL21), test 4, time period 1	25	?	Awatixa
Mahhaha (32OL22), time period 3	31	Painted Woods	Awatixa
?Bagnell (32OL16), late (?) component	18*	Painted Woods	Awatixa
HENSLER PHASE. AD 1525-1600.			
Smith Farm (32OL9)	6	Heart River	Awatixa or Awigaxa/Istopa
Lower Sanger (32OL11)	7	Heart River	Awigaxa/Istopa
Hensler (32OL18)	20-22	Heart River	Awatixa or Awigaxa/Istopa
Alderin Creek (32ME4)	37	Heart River	Awatixa or Awigaxa/Istopa
White Buffalo Robe (32ME7), middle	39	Heart River	Awatixa
Lower Hidatsa (32ME10), time periods 5,6	48,49, 55,57	Heart River	Awatixa
Hotrok (32ME412)	76	Heart River	Awatixa
?Lower Hidatsa East (32ME487)	-	?Heart River	Awatixa
?Lower Hidatsa North (32ME490)	-	?Heart River	Awatixa
?Lower Hidatsa West (32ME499)	-	?Heart River	Awatixa
WILLOWS PHASE. AD 1600-1700.			
Mahhaha (32OL22), time period 2	30	Knife River	?
Lower Hidatsa (32ME10), time periods 3,4	46,47, 54,56	Heart River	Awatixa

Table 25.1. Continued.

Component (Site or Subsite Sample)	Batch Numbers Studied Herein	Complex	Ethnic Tradition
WILLOWS PHASE. AD 1600-1700. Continued.			
Lower Hidatsa West (32ME499)	-	Heart River	Awatixa
Hotrok (32ME412)	76	Heart River	Awatixa
Big Hidatsa (32ME12), time periods 5,6	68,69	Knife River	Hidatsa-proper
?Lower Hidatsa East (32ME487)	-	?Heart River	Awatixa
?Lower Hidatsa North (32ME490)	-	?Heart River	Awatixa
?Taylor Bluff (32ME366), middle component	-	Knife River	?
?Running Deer (32ME383)	98*	Knife River	?Hidatsa-proper
MINNATAREE PHASE. AD 1700-1785.			
Molander (32OL7), upper terrace	4	Knife River	Awaxawi
Mahhaha (32OL22), time period 1	29	Knife River	?
Lower Hidatsa (32ME10), time periods 1,2	44,45, 53	Knife River	Awatixa
Big Hidatsa (32ME12), time periods 3,4	66,67	Knife River	Hidatsa-proper
Nightwalker's Butte (32ML39)	86	Knife River	?Hidatsa-proper
?Lower Hidatsa East (32ME487)	-	?Knife River	Awatixa
?Lower Hidatsa North (32ME490)	-	?Knife River	Awatixa
?Lower Hidatsa West (32ME499)	-	?Knife River	Awatixa
?Running Deer (32ME383)	98*	Knife River	?Hidatsa-proper
ROADMAKER PHASE. AD 1785-1830.			
Greenshield (32OL17)	19	Knife River	Arikara,Mandan
Fort Clark (32ME2)	35	Knife River	Nuitadi/Istopa
Deapolis (32ME5)	38	Knife River	Nuptadi,Nuitadi
White Buffalo Robe (32ME7), latest	-	Knife River	?
Amahami (32ME8), late	41	Knife River	Awaxawi
Buchfink (32ME9), late	-	Knife River	Awaxawi
Sakahami Trail (32ME494)	-	Knife River	Awatixa-Awaxawi
Sakakawea (32ME11), time periods 1-3	60-63	Knife River	Awatixa
Sakakawea Southwest (32ME491)	-	Knife River	Awatixa
Sakakawea Trail Complex (32ME495)	-	Knife River	Awatixa
Sakakawea Cemetery (32ME493)	-	Knife River	Awatixa
Big Hidatsa (32ME12), time period 2	65	Knife River	Hidatsa-proper
Hidatsa Northern Trail Complex (32ME476)	-	Knife River	Hidatsa-proper
Hidatsa High Bench Cemetery (32ME477)	-	Knife River	Hidatsa-proper
Hidatsa Hilltop Cemetery (32ME478)	-	Knife River	Hidatsa-proper
Hidatsa Long Ridge Cemetery (32ME479)	-	Knife River	Hidatsa-proper
Hidatsa Low Bench Cemetery (32ME480)	-	Knife River	Hidatsa-proper
Hidatsa Trail Cemetery (32ME481)	-	Knife River	Hidatsa-proper
Rock (32ME15), early	82	Knife River	Awatixa & Hidatsa-proper
?PG (32OL148), postcontact component	-	Knife River	?
?Scovill (32ME409), late burials	-	Knife River	?Awatixa
?Running Deer (32ME383)	98*	Knife River	?Hidatsa-proper

Table 25.1. Continued.

Component (Site or Subsite Sample)	Batch Numbers Studied Herein	Complex	Ethnic Tradition
FOUR BEARS PHASE. AD 1830-1886.			
Fort Clark (32ME2)	35	Knife River	Arikara,Nuitadi
Deapolis (32ME5)	38	Knife River	Nuptadi,Nuitadi
Boller (32ME6)	-	Knife River	Nuptadi
Amahami (32ME8), late	41	Knife River	Awaxawi
Sakahami Trail (32ME494)	-	Knife River	Awatixa,Awaxawi
Sakakawea (32ME11), time period 1	59	Knife River	Awatixa
Sakakawea Southwest (32ME491)	-	Knife River	Awatixa
Sakakawea Trail Complex (32ME495)	-	Knife River	Awatixa
Sakakawea Cemetery (32ME493)	-	Knife River	Awatixa
Big Hidatsa (32ME12), time period 1	64	Knife River	Hidatsa-proper ?Awatixa,Awaxawi ?Nuitadi
Hidatsa Northern Trail Complex (32ME476)	-	Knife River	Hidatsa-proper
Hidatsa High Bench Cemetery (32ME477)	-	Knife River	Hidatsa-proper
Hidatsa Hilltop Cemetery (32ME478)	-	Knife River	Hidatsa-proper
Hidatsa Long Ridge Cemetery (32ME479)	-	Knife River	Hidatsa-proper
Hidatsa Low Bench Cemetery (32ME480)	-	Knife River	Hidatsa-proper
Hidatsa Trail Cemetery (32ME481)	-	Knife River	Hidatsa-proper
Baker Cemetery (32ME787)	-	Knife River	Hidatsa-proper
Taylor Bluff (32ME366), late	94	Knife River	?
Rock (32ME15), late	82	Knife River	Awatixa
Star (32ME16)	83	Knife River	Arikara
Like-a-Fishhook (32ML2)	85	Knife River	Hidatsa/Mandan/Arikara
?Elbee (32ME408), postcontact component	-	Knife River	?
?Running Deer (32ME383)	98*	Knife River	?Hidatsa-proper
UNASSIGNED TO PHASE, PLAINS VILLAGE TRADITION			
Painted Woods (32BL10)	-	?Painted Woods	?Awatixa
Price (32OL6)	-	?	?
Molander (32OL7), lower terrace	-	?	?
Wildwood (32OL10)	-	?	?
Unnamed (32OL15)	-	?	?
Dennison (32OL19)	-	?	?
Connolly (32OL20)	-	?	?
Quabag (32OL26)	-	?	?
Turkey Feather (32OL43)	-	?	?
Chicagof (32OL54)	-	?	?
Ahler (32OL55)	-	?	?
Chilcoot (32OL56)	-	?	?
Unnamed (32OL106)	-	?	?
Unnamed (32OL114)	-	?	?
Jeep Cut (32OL139)	-	?	?
Ockham (32OL140)	-	?	?
Bundlemaker (32OL159), late component	-	?	?
Cope (32OL193)	-	?	?
Tree Top (32OL266)	-	?	?
Haystack (32OL422)	-	?Painted Woods	?

Table 25.1. Concluded.

Component (Site or Subsite Sample)	Batch Numbers Studied Herein	Complex	Ethnic Tradition
UNASSIGNED TO PHASE, PLAINS VILLAGE TRADITION. Continued.			
Levis (32OL423)	-	?Painted Woods	?
Unnamed (32ME675)	-	?	?
Big White (32ME203)	-	Knife River	?
Elbee (32ME408), main component	74	?	?
Bihohka (32ME310)	-	?	?
Lobodi (32ME411)	-	Knife River	?
Metsiroku (32ME465)	-	?	?
Karishta (32ME466)	-	?	?
Hadu Nowassa (32ME467)	-	?	?
NaxpikE (32ME473)	-	?	?
Bedi Ari (32ME475)	-	?	?
Lower Hidatsa South (32ME488)	-	?	?
Nash (32ME489)	-	?	?
Lower Hidatsa North (32ME490)	-	?	?
Soni (32ME492)	-	?	?
Ramble (32ME496)	-	?	?
Selca (32ME497)	-	?	?
Smaul (32ME498)	-	?	?
Unnamed (32ME43)	-	?	?
Unnamed (32ME54)	-	?	?
Jacobson (32DU1)	-	Knife River	?
Midipadi Butte (32DU2), late component	-	Knife River	?
Bear Den (32DU175)	-	Knife River	?
Unnamed (32DU9)	-	?	?
White Earth Creek (32MN2)	-	Knife River	?
Unnamed (32WI12)	-	?Painted Woods	?

Note: * indicates batch samples thought to contain artifacts representing more than one phase designation.

Only the most direct and pertinent facts about the cultural content of each phase will be provided here. Emphasis is on attributes which serve to distinguish one phase from another and which document cultural change. A full accounting of material content is not attempted; such information can be gleaned from site reports. Many details about the content of various phases or similar units can be found in various other chapters in this volume, particularly in discussions concerning the interpretation of chronological changes in a single type of material culture or suite of related cultural traits. The reader is referred particularly to the interpretive sections in chapters on ceramic analysis (Chapter 17), lithic artifact analysis (Chapter 18), trade artifacts (Chapter 21), architecture and settlement patterns (Chapter 24), and to the work of Weston (1986, 1990) on bone artifacts, for interpretive discussions of cultural changes which cross phase boundaries.

Clark's Creek Phase

Previous name in this volume: Clark's Creek Phase; Period 20.

Components: Clark's Creek (32ME1) (Calabrese 1972; Wood 1986b)
Stiefel (32ME202) (Ahler and Swenson 1980)
Grandmother's Lodge (32ME59) (Woolworth 1956)

Possible additional components: Sagehorn (32ME101) (Wood 1986b)

Geographic distribution: This phase has a spotty distribution in the Knife region, and an even more ephemeral distribution in the larger Garrison region.

Estimated age: AD 1200 to 1300. Two components have been dated by radiocarbon analysis (Table 8.8). Dates cluster in the latter part of the stated phase period. The beginning date for this phase, AD 1200, is a very general guess. A beginning date a century earlier is possible, based on typological cross-dating with sites in the Cannonball region.

Settlement patterns: Few data exist. Fourteen house depressions occur in an area of about 1.6 hectares at Clark's Creek, where houses are arranged in rows. House density there is low, at circa nine per hectare. Any community plan is unclear at Stiefel and Sagehorn. The site area at Stiefel appears to be circa 3.2 hectares. A single, isolated house depression was visible at Grandmother's Lodge. Refuse is shallow at all components, indicating relatively short-term occupation. A single, intermittently used camp site (PG, 32OL148) has been identified for this phase. The physiographic location of Stiefel is unusual; it lies on the Knife River circa three km upstream from its mouth rather than directly on the Missouri River.

Fortifications: No evidence of fortification exists.

Architecture: Surface depressions at Clark's Creek provide a clear suggestion of large, long-rectangular houses, and coring indicates semisubterranean architecture with floors about 60 cm below surface. House depression long axes are oriented northeast-southwest at Clark's Creek. A single semisubterranean, rectangular house measuring circa 9 x 15 m in size with a floor circa 0.45 m below surface occurs at Grandmother's lodge; entry orientation is south-southwest.

Subsistence patterns: Subsistence information is minimal. Reported vertebrate species include bison, canid, deer, antelope, other small mammals, bird, and fish remains. Bison is dominant. No information on plant remains is reported. A dual emphasis on hunting and horticulture is evident from abundant occurrences of stone arrowpoints and bone digging tools; digging tools are abundant even in the extreme upriver site, Grandmother's Lodge, where one might assume maize agriculture to be a marginal pursuit at best, based on present climatic conditions.

Burial: No data are available.

Ceramic technology: Riggs ware with simple lip decoration dominates the collections (overall mean of 68 percent in studied collections). S-rim Fort Yates ware occurs but is less frequent than Riggs ware (overall, 11 percent). Other ware groups occur in low frequency. Body sherd check-stamping is absent or occurs in very low frequency (mean of 4 percent); simple-stamping is the predominant body sherd surface treatment. Body sherds are thicker in this phase than in several subsequent phases (mean of 5.80 mm).

Lithic technology: Arrowpoints are predominantly side-notched in form. Discriminant analysis indicates that subtle morphological details clearly separate arrowpoints in this phase both from earlier, Late Woodland samples, and from all later Village samples. Heat treatment occurs in very low frequency in arrowpoints. An emphasis on use of Knife River flint is evident; this material constitutes 93-94 percent of chipped lithic items. (KRF is the dominant lithic raw material in all regional Plains Village archeological assemblages, but minor yet significant changes in relative frequency of KRF occur through time.) The emphasis on KRF is paralleled by use of other lithic materials having a predominantly western source distribution. An emphasis on bipolar flaking of KRF is also evident, more so than in any subsequent Plains Village phase. The presence of abundant, large pieces of KRF at all sites, and caches of KRF tools at Grandmother's Lodge indicate that components in this phase were instrumental in the distribution of KRF into downstream communities in North and South Dakota which were also part of the Middle Missouri complex. The presence of a ridged, grooved axe at Grandmother's Lodge provides another linkage to Middle Missouri complex (tradition) sites downstream.

Bone technology: Few details are available. Typical Plains Village forms such as awls, pressure flakers, and scapula digging tools occur at Grandmother's Lodge.

Trade artifacts: Trade artifacts are absent; the phase predates Euroamerican contact.

Remarks: The Clark's Creek phase was first defined by Wood (1986b:7-11), who included the phase within the Middle Missouri tradition (generally equivalent to the Middle Missouri complex, as used herein). Our definition of this phase is in substantial agreement with that of Wood. He included two components, Wildwood (32OL10) and Shoreline (32OL103), which we do not include here. The present author tentatively includes Shoreline in the Scattered Village phase based almost entirely on analysis of ceramics from the 1968 Wood/Lehmer testing program. That ceramic sample is admittedly somewhat unlike most others from the region and may be mixed. Wood based his assignment of Shoreline to the Clark's Creek phase in part on the examination of ceramic collections at the SHSND; those samples were not studied by the present author. Wildwood was included in the Clark's Creek phase by Wood, based again on SHSND ceramic samples; again, those samples were not studied by this author. Wood did not include Grandmother's Lodge in this phase, presumably, because of its location in the Garrison region.

Similarities between the components included in the Clark's Creek phase and other components in downriver regions generally classified in the Extended variant of the Middle Missouri tradition (Lehmer 1971) are exceedingly clear. This phase is thought to be a subunit of a much larger cultural unit (Middle Missouri complex) which can be considered as the base for Mandan (ethnic tradition) cultural development in the subarea. The available chronometric data suggest the possibility of chronological overlap between some components in the Clark's Creek phase and some components in the Nailati phase. This overlap may exist for a few decades surrounding the date AD 1300. Such temporal overlap might be quite feasible from the perspective that components in these two phases lie within two large complexes representing respective Mandan and Awatixa ethnic traditions in the subarea. Some of the later Clark's Creek components may represent later Mandan groups who continued to reside in the region as competitive Awatixa groups gradually migrated into the region from outside areas.

Nailati Phase

Previous name in this volume: Nailati Phase; Period 30.

Components:
- Upper Sanger (32OL12), time period 4 (Wood 1986b)
- Mile Post 28 (32OL13) (Calabrese 1972; Wood 1986b)
- Cross Ranch (32OL14) (Calabrese 1972)
- Mahhaha (32OL22), time period 5 (Wood 1986b)
- White Buffalo Robe (32ME7), early component (Lee 1980)
- Amahami (32ME8), early component (Dill 1975; Lehmer et al. 1978)
- Buchfink (32ME9) (Ahler and Mehrer 1984)
- Stanton Ferry (32ML6) (Ahler and Swenson 1980)

Geographic distribution: Throughout the Knife region.

Estimated age: AD 1300 to 1400. Three components have been dated by radiocarbon analysis (Table 8.8). Most of the radiocarbon dates fall well within the estimated time range for the Nailati phase. Some dates from White Buffalo Robe are slightly earlier than those from other sites, suggesting an occupation there which may have begun late in the thirteenth century.

Settlement patterns: Dispersed, open settlements seem to be the norm. At Cross Ranch a single row of nine houses paralleling the river bank and about 19 m apart from center-to-center is evident; additional rows of houses probably occurred in parts of the site now disturbed. At White Buffalo Robe, at least one and probably multiple rows of houses also seem to occur, paralleling the terrace edge. At that site, houses along the row are placed on center-to-center spacing of circa 22 m. Settlement areas range from circa 2.0 to 3.9 hectares. At the two sites mentioned, houses occur in a density of circa 7.0 per hectare. Neither deep middens nor refuse piles occur at any of the components, although a substantial layer of sheet refuse is evident in most cases; relatively short-term or less intense occupation is suggested. At two locations (Mahhaha and Upper Sanger) occupation seems to have continued into the subsequent Scattered Village phase, while at the other sites, the Nailati phase occupation is the only component. A single temporary camp site (Angus, 32OL144) can be assigned to the Nailati phase.

Fortifications: No definite evidence of village fortification occurs. An oval-shaped ditch feature did once exist within a small part of the Buchfink site, but it has been destroyed by gravel mining. It is unclear if it was associated with the Nailati phase occupation or was Euroamerican in origin.

Architecture: Data on architecture are minimal. All information suggests that houses were rectangular in form and were constructed on the existing surface, rather than in an excavated pit as in the preceding Clark's Creek phase. Two houses at Cross Ranch measure circa 7 x 10 m and 6 x 10 m in size, while one at White Buffalo Robe is substantially larger (estimated 9 x 15 m). Entryways are consistently oriented to the southwest. The presence or absence of an *atuti* feature has not been determined for the excavated structures; at White Buffalo Robe some subfloor artifacts appear to occur just outside the line of posts along the side wall of the house, suggesting a storage area and possible *atuti* feature extending beyond the wall line.

Subsistence patterns: A typical Plains Village pattern with heavy but mixed dependence on both hunting and horticulture is evident; gathering of plant foods was also important. Bison is the dominant vertebrate species, with canid, deer, antelope, and wapiti also well represented and with a few other small mammal species occurring. Fish remains occur in notably low frequency in the available samples, especially in comparison to later post-contact age samples. Corn is abundant in plant remains, and other cultigens include bean and sunflower. Wild plant remains include rose, plum, chokecherry, grape, dogwood, and chenopodium. Material culture is consistent with the emphasis on hunting and horticulture. Scapula digging tools are the most common single modified bone type in the collections, and arrowpoints are abundant in the lithic tool samples.

Burial: No data exist on burial patterns in the Nailati phase.

Ceramic technology: The most commonly occurring ceramic groups in the Nailati phase are Riggs ware (overall circa 35 percent) and Fort Yates ware (overall circa 41 percent). Unnamed S-Rim and Unnamed Straight Rim ware groups also occur consistently, with these two ware groups being the preponderate types in a few component samples. Overall, S-rim forms are more common than straight rim forms in the Nailati phase, this being a contrastive feature with the preceding Clark's Creek phase; this pattern becomes more accentuated through the next two phases. Decorative technique is more heterogeneous than in the preceding phase. Horizontal trailing/incising occurs consistently in low frequency in all samples. Stab-and-drag decoration occurs in some but not all samples. The single most distinctive feature of Nailati phase pottery is the high frequency of check-stamping on body sherds. Overall, check-stamped treatment occurs in about 44 percent of all body sherds, and in all but a single component check-stamped treatment is decidedly more common than simple-stamping. Check-stamping is nowhere so common as in the Nailati phase. Body sherd thickness has decreased slightly from the Clark's Creek phase (Nailati mean = 5.51 mm); this is part of a lengthy trend which continues in subsequent phases.

Lithic technology: The dominant projectile point form is the side-notched arrowpoint; this artifact differs only subtly in form from similar tools in the Clark's Creek phase. Heat treatment is slightly more prevalent in the manufacture of arrowpoints in this phase than in earlier periods. Knife River flint is used less commonly for chipped stone tools during this period than in any other phase predating AD 1800. KRF shows a modest decline in occurrence in flaking debris, as well. Non-KRF raw materials suggest diminished linkages or contacts within western territories during this phase, and increasing downriver cultural contacts/linkages. Local raw materials occur relatively frequently in stone tools. Bipolar technology decreases in occurrence in this phase.

Bone technology: A wide array of functional forms and morphological types occur in the extensive collections from the White Buffalo Robe and Cross Ranch sites. Fleshing tools made from cut and beveled long bones perforated through the articular surface are particularly common and are an artifact type which occurs commonly in downstream sites classified in Lehmer's (1971) Middle Missouri tradition (Middle Missouri complex).

Trade artifacts: Trade artifacts are absent in this precontact period phase.

Remarks: The Nailati phase was first defined by Calabrese (1972) on the basis of a large excavation project at the Cross Ranch site. Wood (1986b) has subsequently included four additional sites in the phase, and we have in turn added to the list of Nailati phase components based on more recent ceramic studies reported here. The only discrepancy between Wood (1986b) and the present treatment is in Wood's inclusion of an early component at Bagnell in the Nailati phase. Here we very tentatively place the Bagnell occupation primarily in the Scattered Village phase and the Mandan Lake phase, which follow the Nailati phase. This assessment is based on a low frequency of check-stamped surface treatment in some of the pottery samples from the site, and on radiocarbon dates associated with a reported "early component" house (House 3) which are far too late for the Nailati phase.

In most respects, the definitions of the Nailati phase as originally used by Calabrese (1972) and as used here are not very different. Differences in emphasis do occur, as in the present focus on check-stamped surface treatment in the phase definition. Differences in artifact type terminology also occur. Most of the S-rim pottery at Cross Ranch was classified by Calabrese as Le Beau ware, while it is classified herein as either Unnamed S-Rim ware or Fort Yates ware. This distinction is important for delimiting differences in the ceramics among the Nailati phase and the three subsequent phases.

All components in the Nailati phase are classified in the Painted Woods complex. The primary basis for this distinction, relative to the preceding Clark's Creek phase in the Middle Missouri complex, lies in the difference in body surface treatment and the markedly increased heterogeneity in combinations of pottery rim form and decorative technique (type). Such heterogeneity appears first in the Nailati phase, becomes markedly apparent in the succeeding Scattered Village phase, and then diminishes and disappears in the subsequent Mandan Lake and Hensler phases.

Scattered Village Phase

Previous name in this volume: Early Scattered Village Complex; Period 41.

Components:
- Pretty Point (32OL10) (Wood 1986b)
- Upper Sanger (32OL12), time period 1 (Wood 1986b)
- Upper Sanger (32OL12), time period 2 (Wood 1986b)
- Upper Sanger (32OL12), time period 3 (Wood 1986b)
- Mandan Lake (32OL21), time period 2 (Wood 1986b)
- Mandan Lake (32OL21), time period 3 (Wood 1986b)
- Mahhaha (32OL22), time period 4 (Wood 1986b)
- Lyman Aldren (32ME3) (Wood 1986b)
- Big Hidatsa (32ME12), time period 7 (Ahler and Swenson 1985a)
- Poly (32ME407) (Ahler and Mehrer 1984)
- Scovill (32ME409) (Ahler and Mehrer 1984)
- Forkorner (32ME413), east (Ahler and Mehrer 1984)
- Forkorner (32ME413), west (Ahler and Mehrer 1984)
- Hump (32ME414) (Ahler and Mehrer 1984)
- Youess (32ME415) (Ahler and Mehrer 1984)

Possible additional components:
- Bagnell (32OL14), early (?) component (Lehmer et al. 1973; Angus 1975; Pepperl 1976)
- Shoreline (32OL103) (Wood 1986b)
- Taylor Bluff (32ME366), early (Ahler et al. 1983; Ahler 1988)
- Running Deer (32ME383) (Ahler and Mehrer 1984)
- Black Owl (32ME311)
- Madman's Bluff (32ME312)
- YCC (32ME410)
- Elder (32ME416)
- Yellow Bear (32ME464)
- Lower Hidatsa East (32ME487)

Geographic distribution: A heavy concentration of sites occurs in the KNRI, probably only as a result of intensive survey in that locality. Similar, non-prominent sites in this phase are likely to occur throughout the Knife region and probably throughout much of the Garrison region, as well. Such a widespread occurrence of this phase is posited on the basis of closely related ceramic complexes which have been observed from yet more distant sites in both the Little Missouri and Lower Yellowstone regions.

Estimated age: AD 1400 to 1450. Nine components have been dated by radiocarbon analysis, and two components have been dated by thermoluminescence analysis (Table 8.8). Calibrated radiocarbon curve crosspoints for all nine C-14 dates and the midpoint for one of the TL dates fall within the 50-year time span posited for the Scattered Village phase; this is the basis for the unusually narrow temporal span assigned to the phase. Calibration curve range midpoints exhibit more variation, ranging from AD 1387 to AD 1523, but exhibit a mean of AD 1441, again, within the posited temporal span for the phase.

Settlement patterns: Two types of permanent settlements seem to occur. One consists of relatively large, nucleated villages which exhibit relatively deep midden accumulations and clear house depressions. Examples of this would be particularly Upper Sanger with its meter-thick refuse mantle, and also Mandan Lake, Mahhaha, and possibly Bagnell. These sites all range from about 3.0 to 3.9 hectares in size, although it is not certain that Scattered Village phase materials occur throughout the full spatial extent of each village. All these sites are multicomponent, apparently reflecting long-term, permanent habitation on the same location. House density at Upper Sanger is estimated to be circa 11 per hectare, an increase over that in previous time periods.

The second community settlement pattern is evident at virtually all of the other components, and it has been documented most clearly at several sites within the KNRI. These are all dispersed or diffuse villages with little evident midden accumulation and no visible house depressions. These sites vary greatly in size, ranging from less than one to more than eight hectares. In the southern part of the KNRI, several named sites are actually part of a continuous artifact scatter which exists in varying density over an area of several tens of hectares. One has the impression that the sites in this group consist of small hamlets of one or a few houses which were each occupied for only a very few years and then were abandoned. It is unclear if the multiple sites in the southern KNRI represent a single, very dispersed mega-community occupied during a single period of time, or if the artifact concentration reflects a few, small hamlets frequently relocated across the landscape. Nearly all of these sites at Knife River are located on the margin of the Stanton Terrace, some distance from the present floodplain margin and above the intermediate-level A Terrace. This suggests that when these sites were occupied, farming (and seasonal flooding) occurred on the surface of the A Terrace, rather than on the lower B Terrace as it did in historic times. This in turn suggests a potentially different climatic regime at the time these settlements were occupied.

Most of the test-excavated settlements of the second, dispersed type have been cultivated and have not so far yielded data on architecture. Storage features and the full range of Plains Village functional artifact forms occur in these settlements, however, and there is every reason to believe that they were permanent farming settlements occupied for at least part of each annual cycle. One might hypothesize that the larger, more heavily used villages represent the older, nuclear settlements, and that the scattered, dispersed settlements reflect communities which budded from the nuclear communities as the population in several nuclear communities increased beyond the local carrying capacity. Or perhaps the dispersed settlements at Knife River developed directly out of the few older, Nailati phase settlements in the immediate locality (Buchfink, Amahami, Stanton Ferry, and White Buffalo Robe). The study of regional population based on total pottery production rates suggests, in fact, that regional population during the Scattered Village phase may have increased as much as fivefold over the level in the preceding Nailati phase and as much ten- or fifteenfold over that in the Clark's Creek phase.

Fortifications: No evidence of fortification exists for the Scattered Village phase, except perhaps at the Bagnell site. The evidence there is unclear and contradictory (Will and Hecker 1944:109-110), and the phase association for any fortification at that site is also ambiguous.

Architecture: Virtually no data are available. The rectangular house reported at Bagnell (Lehmer et al. 1973) is considered herein to be associated with the later component at the site, the Mandan Lake phase, on the basis of the associated radiocarbon dates. Lehmer considered this to be an "early" component house, and he associated circular houses with the "late" component there. Examination of the field maps for all of Lehmer's excavations at Bagnell has left the present author unconvinced that any circular houses exist at the site. The reported house (House 3) at Bagnell will be discussed under the Mandan Lake phase.

Subsistence patterns: Virtually no data are available. General conformance to the Plains Village tradition pattern of emphasis on bison hunting and corn horticulture is assumed and is confirmed in the material culture which contains scapula digging tools, abundant arrowpoints, and storage features.

Burial: No data exist on burial practices. Wood (1986b:15) reports that Lehmer excavated several burials at Bagnell, but the site is basically unreported.

Ceramic technology: The ceramic collections are distinguished by marked heterogeneity in rim form, ware classification, decorative techniques, and types. S-rim groups are more common than straight rim forms. Dominant ware groups are Unnamed S-Rim ware and Unnamed Straight Rim ware; Fort Yates ware and Le Beau S-Rim ware also occur and the former can comprise up to 40 percent of some collections. A wide variety of decorative techniques occur including those which involve trailing, incising, tool modification, and stab-and-drag, and these are applied widely to both S-rim and straight rim vessel forms. Extensive flattening modification and decoration of the vessel lip is characteristic of this phase. The overall picture is that the ceramic assemblages reflect an amalgamation of diverse vessel form and decoration ideas borrowed from several sources and fused into a pattern which lacks a dominant typological expression but which is nonetheless subtly coherent from site to site. Part of this coherence includes the consistent but secondary use of check-stamped body surface treatment which shows up in all component samples (overall, 12 percent of body sherds are check-stamped).

Lithic technology: The dominant arrowpoint form continues to be the side-notched form; these artifacts differ only very subtly in form from those in temporally adjacent phase periods. With reference to raw material utilization patterns and technological composition, Scattered Village phase components reflect a continuation of temporal trends evident in the preceding Nailati phase. Overall, heat treatment continues to be more widely used in the manufacture of arrowpoints, but this increased occurrence is not uniform across components. Heat treatment is particularly evident at Mandan Lake, Mahhaha, and Pretty Point components, but is not nearly so evident at other sites. The meaning of this intraphase variation is unclear, but this feature continues into subsequent phases. A relatively low occurrence of KRF and high occurrence of local lithic materials are particularly evident in flaking debris (clear chalcedony is particularly common), and the use of materials having western sources continues to diminish. A slight increase in occurrence of downriver exotics occurs in flaking debris. The use of bipolar technology continues at a moderate level consistent with the Nailati phase. Large unhafted spall or slab hide scrapers occur for the first time in the regional sequence, and the incidence of chipped stone tool recycling is at an all-time low among regional samples.

Bone technology: Virtually no data are available regarding modified bone artifacts.

Trade artifacts: No trade artifacts occur in this phase, which is pre-contact in age.

Remarks: Although several of the major components in this phase had been excavated and studied in some fashion by other researchers, this taxonomic unit, the Scattered Village phase, has gone unrecognized as a separate entity in previous studies. Most of the components lying outside the KNRI included in this phase had previously been included in the Heart River phase by Lehmer and Wood (Wood 1986b), including components at Pretty Point, Upper Sanger, Bagnell, Mandan Lake, and Mahhaha. Most of the components included here by the present author were originally assigned to the more nebulous "Scattered Village complex" originally described by Lovick and Ahler (1982). The key elements in that original complex definition have carried over for the most part into the definition of this phase.

The integrity of the Scattered Village phase as a coherent taxonomic unit is difficult to demonstrate due to the lack of simple and highly redundant ceramic typological groups occurring in consistently high frequency from site to site. This is in itself, though, a significant cultural theme for this phase. Another significant theme is the apparent population explosion reflected by the known components assigned to this phase. This fivefold or greater population increase far exceeds what could be expected from normal population growth and strongly suggests massive population movement or immigration into the Knife region. Such migration, perhaps from multiple source areas, is highly consistent with the heterogeneous pottery typology exhibited in this phase. When this is considered in association with evidence for shifts to budded, dispersed communities and shifts in cultivation patterns involving farming on higher terrace surfaces, a picture of extremely dynamic cultural interaction and change emerges. It is hypothesized that climatic change is the driving force for this cultural dynamism, causing new population groups to move into the region, and causing or allowing budded farming communities in turn to expand upriver into new, productive territories. The dispersed settlement patterns and absence of village fortifications suggest that this process occurred with a minimum of intergroup hostility. The lack of hostility suggests that competition for new territory was not great, and that the environment favored both the immigration process and the expansion of village farmers into new, upriver territory.

Mandan Lake Phase

Previous name in this volume: Late Scattered Village Complex; Period 42.

Components: Mandan Lake (32OL21), test 1, time period 1 (Wood 1986b)
Mandan Lake (32OL21), test 3, time period 1 (Wood 1986b)
Mandan Lake (32OL21), test 4, time period 1 (Wood 1986b)
Mahhaha (32OL22), time period 3 (Wood 1986b)

Possible additional components: Bagnell (32OL16), late (?) component (Wood 1986b; Lehmer et al. 1973; Angus 1975; Pepperl 1976)

Geographic distribution: The Mandan Lake phase is presently known from only three loci in the central part of the Knife region. No components are known from the Garrison region.

Estimated age: AD 1450 to 1525. Three components have been dated by radiocarbon analysis (Table 8.8). Dating of this phase by radiocarbon analysis is difficult, due primarily to severe short-term oscillations in the radiocarbon calibration curve after the late fifteenth century AD. One of the three components has a calibrated date which falls within the stated range of AD 1450-1525, while the other two have calibrated central tendencies which fall 20 to 80 years later than the stated range. All have two sigma ranges which overlap the stated period completely. The suggested age range for the Mandan Lake phase is derived in part from ceramic seriation in conjunction with dates from other sites outside this phase.

Settlement patterns: All designated components are relatively large, dense settlements which contain a significant accumulation of refuse and prominent house depressions. Site size ranges from about 3.5 to 3.9 hectares. All sites are multicomponent, reflecting lengthy occupation periods, and at two locations (Mandan Lake and Bagnell) the posited Mandan Lake components comprise the latest period of occupation. Assuming that surface-visible houses at these two sites can be associated with this phase, the house density can be computed at 25-28 per hectare. This density reflects a twofold increase over that in the preceding Scattered Village phase and a three- to fourfold increase over that in the Nailati phase. Scattered, dispersed communities so common in the Scattered Village phase have not been discovered for this phase. It is apparent that a major change in settlement pattern occurred between these two phases, resulting in a small number of large, nucleated, and densely packed communities. Studies of regional population change through analysis of ceramic production rates suggest a 60 percent reduction in regional population at this time. Severe depopulation through disease or emigration from the region, or both, is suggested.

Fortifications: Definite evidence of fortification is absent in the Mandan Lake phase, except perhaps at the Bagnell site. The evidence there is unclear and contradictory (Will and Hecker 1944:109-110), and the phase association for any fortification feature at that site is also ambiguous. Given the major change in settlement pattern evident in this phase, from multiple dispersed settlements to a few, dense settlements, fortification could be predicted as an additional element of the defensive posture suggested by habitation in large, nucleated communities.

Architecture: Wood (1986b:15) notes that the house depressions at Mandan Lake appear to be circular in form. The only detailed architectural information for this phase comes from the Bagnell site. A single rectangular house at Bagnell (House 3) has been described (Lehmer et al. 1973). This house unit and associated material are assigned to this phase by the present author based on the associated radiocarbon date. The house has a rectangular floor plan measuring circa 8 x 11 m within the wall post lines. The floor of the house apparently lies in a 20 cm deep pit. The house burned, preserving unusual details of an arrangement of "leaner" posts or puncheons which surrounded the vertical, peripheral wall posts, just as in the historic Hidatsa earthlodge (Wilson 1934). This leaner arrangement provided an *atuti* area, giving an additional 85 percent more storage/living area within the structure. Except for the *atuti* feature, this house is similar in architectural details to Nailati phase structures excavated at Cross Ranch.

Subsistence patterns: Virtually no interpretive data are available. Expression of the Plains Village pattern of emphasis on bison hunting and horticulture is assumed.

Burial: Wood (1986b:15) states that Lehmer excavated burials at Bagnell, but that work has not been reported. No other data exist on burial practices.

Ceramic technology: The ceramic typological composition in the Mandan Lake phase is similar in many respects to that in the preceding Scattered Village phase, and the reader is referred to the detailed discussion in the preceding section. One significant change in the Mandan Lake phase which sets it apart typologically from previous units is the marked increase in the frequency of Le Beau S-Rim ware (overall, it increases from 6 percent in the Scattered Village phase to 34 percent in the Mandan Lake phase). Cord-impression also increases in frequency as a decorative technique, comprising, overall, 64 percent of the decorative type occurrences. Check-stamping continues to occur in surface treatment, comprising overall 6 percent of the body sherd sample. Body sherd thickness exhibits a marked decrease in this phase, with the mean value of 4.84 mm being the minimum recorded for all phases in the region.

Lithic technology: Side-notched arrowpoints continue to be the dominant form, and only subtle differences in overall morphology in side-notched points occur between the Mandan Lake sample and other phase samples. Heat treatment continues to become more common in arrowpoint manufacture, with the Mahhaha and the Mandan Lake test 4, period 1 components expressing particularly high incidence of this technological feature. Lithic source utilization patterns are basically unchanged from the previous Scattered Village phase, with key features being a relatively low occurrence of KRF, relatively high use of local materials, low use of exotic western materials, and (particularly in flaking debris) a relatively high incidence of exotic materials from downriver sources. The suggestion is that downriver cultural contacts have been maintained or possibly strengthened during this phase, at the expense of western contacts. Available data do not reveal any other major changes in tool functional or technological patterns.

Bone technology: Virtually no data are available on modified bone for the Mandan Lake phase.

Trade artifacts: Trade artifacts are absent in the studied samples.

Remarks: This phase is named for the Mandan Lake site where it has its clearest expression among the component samples which have been studied. The temporal integrity of this phase is difficult to demonstrate due to the problems in calibration of radiocarbon dates falling in this general time frame. This taxonomic unit was originally defined on the basis of ceramic studies which showed the characteristics of the included components to be essentially transitional between the earlier Scattered Village phase and subsequent Hensler phase. Ceramic affinities with the preceding phase were so clear that this taxonomic unit was originally designated as a subperiod (period 42) division of the Scattered Village complex (periods 41 and 42, including both early and late Scattered Village complex subparts). Subsequent analysis of settlement patterns and regional population changes has demonstrated that components included here differ so markedly from slightly earlier components that they clearly deserve separate phase distinction. Hence, the Mandan Lake phase designation, rather than simply a late subpart of the Scattered Village phase.

The temporal and cultural integrity of this phase unit still remains somewhat open to question. The few component samples included here all derive from sites with lengthy occupations and the attendant potential for mixing of material culture between temporal periods. The Mandan Lake site, in particular, has had a long history of extensive pothunting and uncontrolled disturbance, and the possibility remains that the samples studied from there do not have good stratigraphic or cultural integrity. The same is true for Mahhaha, a site with a very lengthy total period of cultural use, but in which individual temporal components may be highly compressed and subject to mixture by later occupants. A thorough study of the extensive excavated samples from Bagnell might tend to clarify the integrity, content, and temporal placement of this important culture-historic unit.

This taxonomic unit or its analog have not been previously recognized in the literature. Lehmer and Wood (Wood 1986b) recognized a "Heart River phase" in the region and they placed a wide array of components from many sites in that unit, including primarily the components we would classify here in the Scattered Village, Mandan Lake, and Hensler phases. Wood places the late component at Bagnell, what he terms the middle component at Mahhaha, and all deposits at Mandan Lake in his Heart River phase. In his discussion of the late component at Bagnell, Wood (1986b:15) mentions the excavation by Lehmer in 1970 of two circular houses. These have not been reported in detail. The author has examined the field maps of these houses and remains unconvinced that any architecture other than rectangular houses exists at the site. Certainly, several of the existing prominent house depressions along the terrace edge at Bagnell have a distinctly elongated form, suggesting a rectangular house form. The use of leaners and the *atuti* feature with a rectangular superstructure would tend to mute the rectangularity of the resulting house depression, perhaps yielding depressions that appear more circular than rectangular from the present surface. It is likely that most components associated with the following Hensler phase have predominantly circular house forms. On this basis, it seems certain that the components in the Mandan Lake phase hold the key to the regional change from a predominantly rectangular to a predominantly circular house form.

Hensler Phase

Previous name in this volume: Heart River Phase; Period 50.

Components: Smith Farm (32OL9) (Wood 1986b)
Lower Sanger (32OL11) (Wood 1986b)
Hensler (32OL18) (Wood 1986b)
Alderin Creek (32ME4) (Wood 1986b)
White Buffalo Robe (32ME7), middle
(Lee 1980)
Lower Hidatsa (32ME10), time period 5 (Ahler and Weston 1981; Weston 1986, 1990)
Lower Hidatsa (32ME10), time period 6 (Ahler and Weston 1981; Weston 1986, 1990)

Geographic distribution: Hensler phase components occur throughout the Knife region. None are known from the Garrison region.

Estimated age: AD 1525 to 1600. Six of the seven components at five sites have been dated by radiocarbon analysis, and one component has been dated by thermoluminescence analysis (Table 8.8). Interpretation of the available radiocarbon dates is extremely difficult due to the severe short-term fluctuations in the dendrochronological correction curve during this general period. Even so, the computed radiocarbon date-range midpoint on the dendro calibration curve falls within the posited time frame for the phase for all six dated components. The mean calibration curve crosspoint falls within the posited temporal range for three of the six components, with the remaining three component crosspoints falling 35 to 80 years earlier than the posited temporal span. In the end, the temporal span for this unit was based on the radiocarbon dates considered in conjunction with the extreme ceramic typological homogeneity of the sample (suggesting a short temporal span), the absence of trade artifacts, and the stratigraphic position of these components within the Lower Hidatsa site (lying directly beneath deposits containing trade artifacts and dating in the AD 1600s).

Settlement patterns: The components exhibit considerable variation in settlement size, ranging from 1.6-1.8 hectares at Smith Farm and Lower Sanger to a maximum of about 4.0 hectares at Hensler. Hensler, in fact, stands out from all the other components as having not only a large area but also a relatively deep and extensive refuse deposit suggesting quite long-term use of the site. At most other sites, refuse deposits are much thinner, suggesting that occupation was relatively brief. House densities within sites vary from circa 15 to 21 houses per hectare at the southernmost sites to a maximum of circa 30 per hectare at Hensler. Study of pottery production rates indicates that regional population during the Hensler phase decreased by about 10 percent from the level in the preceding Mandan Lake phase. This is a minor decrease compared with that in the preceding and following phases, but it is part of an overall trend toward declining population which continues from circa AD 1450 through AD 1650. A peripheral site use area, designated the Hotrok site (32ME412) has been associated with the Hensler phase components at Lower Hidatsa Village in the KNRI. The Hotrok site consists primarily of a dump area for fire-cracked rock apparently used in ceremonial sweatlodge activities performed by the inhabitants of Lower Hidatsa Village.

Fortifications: Fortification features definitely occur at Smith Farm, Lower Sanger, and Alderin Creek. In each case, these consist of a relatively shallow ditch, lacking apparent bastions, encircling the settlement. It is of note that fortifications occur at the southernmost and some of the most briefly occupied sites. This suggests occupancy by either intrusive groups or remnant groups, operating in a defensive posture and within a state of flux in settlement location.

Architecture: Surface features indicate that circular houses were the norm during the Hensler phase. The margin of a circular house built in a shallow pit was excavated at Lower Sanger, and unreported excavations by the State Historical Society of North Dakota in 1968 at Alderin Creek revealed an apparently circular house about 12 m in diameter, built on the ground surface, and having very amorphous architectural details. Bowers (personal communication to S. Ahler, 1981) excavated a rectangular lodge in 1929 at the Hensler site; this is thought to have been a ceremonial lodge in the center of the village, and it may not be the typical form for dwellings in that community.

Subsistence patterns: Detailed data exist only for the Hensler phase component at White Buffalo Robe. Hunting focused on bison; other common vertebrate species used for subsistence include deer, antelope, and canids. In comparison to the Nailati phase component at the same site, bison is more intensively utilized in the Hensler phase, and fish is added to the vertebrate subsistence base. Wapiti, deer, and antelope were less intensively utilized. Plant remains include the cultigens corn, beans, and sunflower, and wild dock, rose, plum, chokecherry, buffalo berry, grape, and dogwood also occur. The available data suggest that, relative to the Nailati phase data from the same site, Hensler phase peoples at White Buffalo Robe relied more heavily on the full array of cultigens and less heavily on wild plant foods.

Burial: No data exist concerning burial patterns. Intravillage, subterranean burials are common in several of the possibly contemporaneous villages in the Heart River complex in the Heart region, sites presumably occupied by the Mandans. A similar pattern of burial in pits within the village has not been discovered at the Knife region sites in this phase.

Ceramic technology: Ceramic assemblages are dominated by Le Beau S-Rim ware, and particularly the type Le Beau Cord-Impressed. Le Beau S-Rim ware is the majority group in all component assemblages and, overall, it constitutes 79 percent of the pottery classified by ware. Overall, cord-impression occurs on 89 percent of the classified ceramic vessels. These features are the hallmark, or better yet, the horizon marker for the Heart River complex of which the Hensler phase is a part. Check-stamping is a rare body surface treatment (overall, 2 percent). Body sherd thickness is extremely low (overall mean, 4.97 mm), as it was in the preceding Mandan Lake phase.

Lithic technology: Few changes in lithic technology occur in this phase when compared to the patterns noted for the preceding Mandan Lake phase. The side-notched point form dominates, and these artifacts differ little in morphology from samples in adjoining time periods. Overall use of heat treatment remains relatively high, but considerable intervillage variation exists in this trait. Smith Farm and Lower Sanger exhibit the most common usage of heat treatment. Lithic source utilization patterns are little changed from the previous period; use of KRF is relatively diminished, linkages to downriver source areas continue to be apparent, linkages to western source areas continue to be weak, and local materials are also relatively well represented.

Bone technology: Most available data come from the Hensler phase component at White Buffalo Robe. A wide array of functional and morphological forms common to the Plains Village tradition occur there. One feature of note is the total absence of the axially drilled or perforated bone fleshing or hide working tool, so common in the earlier Nailati phase components at White Buffalo Robe. Fleshing tools in any form are absent in the Hensler phase component at White Buffalo Robe. Weston's (1986, 1990) study of modified bone from Lower Hidatsa confirms a low frequency of fleshers in the Hensler phase components at that site. Significantly, one example of bone tool manufacture with a metal, presumably trade, artifact occurs in the Lower Hidatsa assemblage, providing the earliest documentation of indirect Euroamerican trade influence in the region, predating AD 1600.

Trade artifacts: Trade artifacts are absent in the studied collections. Evidence of bone working with metal tools at Lower Hidatsa means that metal artifacts were, in fact, used by some of the villagers during this period, approximately 140 years or more before the earliest recorded direct Euroamerican contact. Additional excavation with fine-screen recovery could be expected to yield actual occurrences of trade metal and glass beads in extremely low frequencies in this phase.

Remarks: The name for the Hensler phase is derived from the Hensler site which contains by far the most prominent and extensive expression of this phase within the region. This new phase name was applied, in lieu of the term "Heart River phase," because the term Heart River was thought more appropriately applied to the general complex (or stylistic horizon) of which the Hensler phase is a part. The nuclear or climax area for the Heart River complex is thought to lie near the mouth of the Heart River. Since it is felt that several discrete phases will eventually be defined to account for the Heart River complex in the Heart region, it seemed inappropriate to continue using the term "Heart River phase" to apply to a taxonomic unit confined to the Knife region.

The question of internal variation within the Hensler phase (and, more generally, within the Heart River complex or phase) has been of long-standing interest, particularly with reference to possible distinctions between the prehistoric Mandans and Hidatsas. Bands or subgroups of both tribes claim early residence at villages within the lower part of the Knife region, above Square Buttes. At a general typological level, the components included here within this phase are extremely homogeneous, regardless of their location within the region. Considerable effort in the ceramic analysis was devoted to detailed intercomponent comparisons of pottery and, particularly, Le Beau S-Rim ware pottery, within the Hensler phase. The results are less than clearcut with regard to possible Mandan or Hidatsa tribal distinctions. Certain fine-grained stylistic differences do exist among nearly all components, and in general, the two most upstream components, Lower Hidatsa and White Buffalo Robe, are most distinct from the other components. A clear geographic or other demarcation in components does not exist, however, and the division of the Hensler phase into subunits having tribal significance cannot be supported at the present time. Interpretation of intraphase variation is further complicated when settlement pattern data are considered, with some sites having been occupied by small groups apparently on the move, and with other sites having been the focus of long-term occupation. With regional populations in an apparent state of settlement flux, geographic proximities between sites may not be particularly meaningful relative to the Mandan versus Hidatsa question. Pursuit of the whole question could be aided considerably by inclusion of chronologically controlled data from the Heart region, presently lacking.

Virtually all components included here have been included by Wood (1986b) in his "Heart River phase," which, as noted in the discussion of the Mandan Lake phase, has a much more inclusive meaning analogous to the Heart River complex used herein.

Willows Phase

Previous name in this volume: Heart River Phase/Knife River Phase Transition; Periods 60, 61, and 62.

Components: Mahhaha (32OL22), time period 2 (Wood 1986b)
Lower Hidatsa (32ME10), time period 3 (Ahler and Weston 1981; Weston 1986, 1990)
Lower Hidatsa (32ME10), time period 4 (Ahler and Weston 1981; Weston 1986, 1990)
Big Hidatsa (32ME12), time period 5 (Ahler and Swenson 1985a; Weston 1986, 1990)
Big Hidatsa (32ME12), time period 6 (Ahler and Swenson 1985a; Weston 1986, 1990)

Geographic distribution: Presently known Willows phase components are confined to a small area near and just downstream from the mouth of the Knife River in the Knife region. We would expect the Awaxawi subgroup of the Hidatsas to have occupied villages assignable to this phase. Awaxawi oral tradition suggests early occupation near Square Buttes, near the Heart River, and/or below Heart River, and Willows phase components can be expected to be identified someday in those localities.

Estimated age: AD 1600 to 1700. Three components have been dated by radiocarbon analysis, and four components have been dated by thermoluminescence analysis (Table 8.8). Due to the severe fluctuations in the dendrochronological calibration curve for this general time period, the radiocarbon dates have very broad ranges at the two sigma level and are of little use for precision dating. Central tendencies for two of the four TL dates fall within the posited temporal span for this phase, and two others are 39 to 77 years later. Overall, several other factors in addition to chronometric dates were given priority in estimating the temporal span for this phase, among them being stratigraphic position within both the Lower Hidatsa and Big Hidatsa sites, ceramic seriation, presence and density of trade artifacts, and body sherd thickness measurements.

Settlement patterns: Villages in the Willows phase were few in number, moderate in size, and fairly densely settled. Lower Hidatsa has an area of circa 2.0 hectares, and Big Hidatsa grew in area from about 2.3 hectares to circa 3.2 hectares during the course of this phase. This growth in village area at Big Hidatsa is consistent with traditions describing immigration of Hidatsas-proper into the region early in time. The Mahhaha site occupation area may have been comparable in size to that at Big Hidatsa. House density was approximately 18 houses per hectare at Big Hidatsa but cannot be determined at other sites. Occupation seems to have occurred more or less continuously throughout the 100-year span of this phase at both Big Hidatsa and Lower Hidatsa. Such continuous occupation is far from clear and less likely at Mahhaha which has a much shallower refuse accumulation. Measurements of the volumetric density of cultural debris indicate that pottery, faunal, and lithic flaking refuse densities are much greater at Lower Hidatsa Village than at Big Hidatsa Village. This in turn suggests a lower intensity/frequency of occupation at Big Hidatsa, perhaps in keeping with the nomadic, nonhorticultural origins for the Hidatsa-proper band units who settled at Big Hidatsa Village.

Measurements of pottery production rates indicate a significant, further collapse in regional population from previous levels in the early part of the Willows phase, and then a modest increase in regional population in the late part of this period. The initial decrease is an almost two-thirds reduction from the level in the Hensler phase. Such a dramatic decrease is likely attributable to one or more epidemics from virulent Euroamerican pathogens which probably swept most of the North American continent during this period. A population increase of circa 50 percent is posited for the later half of this period. This increase is probably largely attributable to immigration of previously nomadic Hidatsa-proper bands into the region.

Intensive survey in the KNRI has revealed several sites which constitute special-activity, non-habitation areas apparently used in conjunction with intensive habitation in the major settlements. These include components at Taylor Bluff (32ME366) and Running Deer (32ME383) used in conjunction with Big Hidatsa Village, and Lower Hidatsa West (32ME499) and Hotrok (32ME412) near Lower Hidatsa Village. The exact function of these sites is not clear.

Fortifications: No clear evidence for fortification exists for any of the components in the Willows phase. The remnants of fortification ditches evident at Big Hidatsa almost certainly relate to much later components at that site.

Architecture: Circular house forms are evident on the surface in the northern periphery area at Big Hidatsa Village, in a part of that village which can be attributed in large measure to Willows phase occupation. No detailed data are available on house form for other components of this phase.

Subsistence patterns: No specific data are available regarding subsistence remains for components in the Willows phase.

Burial: No data are available for the Willows phase.

Ceramic technology: Pottery assemblages assigned to this phase are characterized by co-occurrence of two distinctly different pottery wares, Le Beau S-Rim ware and Knife River ware. The presence of Le Beau S-Rim ware is attributed to the continuing influence of the "Mandan ceramic tradition" centered in the Heart River complex in the Heart region. The presence of Knife River ware, a pottery form totally new to the region, is attributed to migration of Hidatsa-proper and Awaxawi subgroups of the Hidatsa tribal group into the Missouri valley from regions lying to the east. Co-occurring with Knife River ware is what is termed Transitional S-Rim ware which combines rim form and decorative characteristics of both Knife River and Le Beau ware groups. The relative frequency of combined Knife River ware and Transitional ware (and also Deapolis Collared ware, a related typological group) is taken as a measure of the degree of influence from the recently introduced Hidatsa-proper/Awaxawi ceramic tradition. This ceramic tradition is expressed as the Knife River complex. Components at Lower Hidatsa exhibit a majority occurrence of Le Beau S-Rim ware, reflecting stronger typological linkages to the Mandan ceramic tradition and continuing classification as part of the Heart River complex. In contrast, components in this phase at Big Hidatsa and Mahhaha exhibit predominantly Knife River ware and associated wares, reflecting stronger typological linkages with the mainstream of the late Hidatsa ceramic tradition and classification in the Knife River complex.

The two ware groups are not only typologically distinct, but are technologically distinct as well. Knife River ware is consistently thicker and coarser in manufacture, as expressed in vessel wall measurements. Mean body sherd thickness measurements increase for components assigned to this phase. The amount of increase in body sherd thickness is roughly proportional to the amount of Knife River ware pottery in a component assemblage. From a mean sherd thickness value of 4.97 mm in the preceding Hensler phase, mean values rise to 5.13 and then 5.32 mm in the two temporal subunits of the Willows phase. Check-stamped surface treatment is rare in Willows phase components, generally comprising 1-2 percent of any body sherd collection.

Lithic technology: Arrowpoints continue to be predominantly side-notched in form. Subtle morphological details change significantly in this phase, continuing along a trend that is evident throughout the Plains Village tradition in the region and in other parts of the Plains. The incidence of heat treatment in arrowpoints remains relatively high and constant in this phase. Intercomponent differences in heat treatment are marked, however; heat treatment is particularly common at both Mahhaha and Lower Hidatsa, but is particularly uncommon at Big Hidatsa. There is an abrupt increase in the use of KRF in this period, accompanied by a distinct shift from emphasis on exotic downriver lithic sources to emphasis on western exotic lithic sources. The patterns in lithic source utilization are taken to indicate a strong shift in cultural interaction and possibly territoriality away from the Mandans at Heart River and toward western regions and the nomadic groups occupying them (perhaps interactions with early River Crow groups are represented). Bipolar flaking technology diminishes sharply in this phase from a moderate level of usage in the preceding phase. Expedient cutting tools become more common in this phase, and use of unhafted, spall hide scraping tools also becomes significantly more common. Both these changes may reflect influence from indirect Euroamerican contact. The presence of metal cutting tools may have begun to diminish the importance tied to use of patterned cutting tools, and the demand for furs may have promoted the use of expedient hide preparation techniques.

Bone technology: Data compiled by Weston (1986, 1990) indicate several changes in modified bone assemblages and technology during the Willows phase. The influence of metal artifacts obtained through indirect trade is very evident. One effect is a modest decrease in frequency of bone awls during this period, probably in response to increased use of metal awls. Knife handles slotted for metal blades occur in the latter part of this period. Evidence for the use of metal implements for the manufacture of bone tools occurs on about 25 percent of the classifiable bone implements.

Trade artifacts: Both glass beads and metal artifacts appear for the first time in extremely low numbers in the regional collections, and both items increase slightly (metal, more so) in relative occurrence during the course of the Willows phase. Identifiable metal items include an awl, a knife blade, and conical and tubular copper ornaments. Small, drawn glass beads are predominantly blue in color.

Remarks: The Willows phase is a new taxonomic unit for the Knife region, it being named after the term "Hidatsa," referring to the Hidatsas-proper, meaning "People of the Willows" (Bowers 1965:14-15; Gilbert L. Wilson's unpublished field notes for 1913, ms. p. 201, copy on file, Department of Anthropology, University of North Dakota). This name is chosen to signify the first appearance of the Hidatsas-proper in the regional archeological record at Big Hidatsa Village, and the striking influence that these peoples and their fellow travelers, the Awaxawis, had on the regional archeological record. This phase marks the termination of Mandan typological dominance emanating from the Heart River area, and the beginning of self-awareness of the various Hidatsa subgroups as a distinct tribal unit. This transformation of self-perspective and cultural influence is evident both in the ceramic record as well as in the lithic raw material source record. This phase is also significant in that it marks the real beginning of Euroamerican influence on native material culture and technologies. The continuing dramatic depopulation which occurs in the early part of this phase is almost certainly attributable to Euroamerican disease.

The integrity of the Mahhaha, period 2 component, and, likewise, its placement in this phase, are subject to some question. This assignment is based largely on the ceramic ware composition of that analytic batch unit. Certainly the TL dates suggest a later temporal placement, perhaps in the eighteenth century and in the following Minnetaree phase. The stratigraphy at Mahhaha is highly compressed, and the particular makeup of the ceramic sample for this component may simply be the result of mixture of deposits of two disparate ages. Only additional, controlled work at the site can resolve this issue.

Minnetaree Phase

Previous name in this volume: Early Knife River Phase; Periods 70, 71, 72.

Components:	Molander (32OL7), upper terrace (Wood 1986b)
	Mahhaha (32OL22), time period 1 (Wood 1986b)

Lower Hidatsa (32ME10), time period 1 (Ahler and Weston 1981; Weston 1986, 1990)
Lower Hidatsa (32ME10), time period 2 (Ahler and Weston 1981; Weston 1986, 1990)
Big Hidatsa (32ME12), time period 3 (Ahler and Swenson 1985a; Weston 1986, 1990)
Big Hidatsa (32ME12), time period 4 (Ahler and Swenson 1985a; Weston 1986, 1990)
Nightwalker's Butte (32ML39) (Lehmer et al. 1978)

Geographic distribution: Minnetaree phase components are concentrated at the Knife River, but occur elsewhere downstream in the Knife region and upstream in the Garrison region.

Estimated age: AD 1700 to 1785. Three components have been dated by thermoluminescence analysis (Table 8.8). Central tendencies for two of the three TL dates fall within the posited temporal span. Greater weight is given to stratigraphic position, ceramic seriation, trade artifact density, and oral tradition than to TL dates in the dating of this phase. The ending date for this phase, AD 1785, is chosen to lie shortly after the first historically documented smallpox epidemic which swept the region in AD 1780-1781 and which marked a turning point in the history of all Plains Village cultures.

Settlement patterns: Two nucleated settlements occur in this period, one at Lower Hidatsa (Awatixa Hidatsas) and the other at Big Hidatsa (Hidatsas-proper). The Awaxawi Hidatsas resided for at least part of this period at Molander, and an unknown group, presumably some subgroup of the Hidatsas, lived for at least part of this period at Mahhaha. Settlements in this phase vary greatly in size, ranging from Nightwalker's Butte on the small end at circa 0.5 hectare to Big Hidatsa at the other extreme at circa 5.2 hectares. Nightwalker's Butte is probably an anomaly, it being a briefly occupied, butte-top redoubt. Hidatsa traditions abound with stories of splinter groups separating from one of the main villages and establishing themselves in a separate village for a short period of time. Nightwalker's Butte probably represents such an event. The remaining villages, probably reflecting longer term occupation, range in size from 1.8 to 5.2 hectares. House depressions are clearly evident at all of these locations, and there is a substantial midden deposit at all sites except Nightwalker's Butte. Midden is deepest at Lower Hidatsa and Big Hidatsa, and these villages were probably occupied more or less continuously through the duration of the posited phase period. Settlement density is greatest at Nightwalker's Butte where living space was restricted and where houses were small (56 houses per hectare). Settlement is moderately dense in the other locations ranging from circa 18 to 29 houses per hectare. Studies of ceramic production rates indicate a modest population increase of about 15 percent during each half of this period, or a total increase of nearly 30 percent during the entire period. Known activity areas, peripheral to but adjacent to the main villages, are poorly known for this period. The Running Deer site (32ME383) probably served such a purpose for Big Hidatsa Village. Many trail complexes and cemetery areas lie proximate to Big Hidatsa and possibly to Lower Hidatsa, but it is unclear if these were used during this period. Their use is more definite during the subsequent phases, post-dating AD 1785, based on historic documentation.

Fortifications: Definite evidence of fortification occurs at both Molander and Nightwalker's Butte. The ditch at Molander curves around the village and has several apparent bastions. A curving palisade encircled at least part of Nightwalker's Butte. Such certain evidence is lacking for the larger settlements; the ditch features visible at Big Hidatsa probably relate to a later period of village use.

Architecture: Based on visible surface expression, circular, earth-covered houses were the norm at all settlements in the Minnetaree phase. Architectural details are available only for Nightwalker's Butte. Houses typically had four center posts arranged about a central hearth and widely spaced peripheral posts. Posts lining the entryway were placed in a shallow trench. House diameters at Nightwalker's Butte are typically smaller than apparent structures at the other villages (based on depression sizes) and smaller than the typical historically described structure (cf. Wilson 1934).

Subsistence Patterns: Few data are available. The vertebrate collection from Nightwalker's Butte is dominated by bison; wapiti, canid, deer, antelope, bear, and several smaller mammals are also present. Wapiti is unusually abundant, and a large portion of the bison sample is made up of immature individuals.

Burial: No definite information exists on burial practices. Large cemeteries occur near the Lower Hidatsa and Big Hidatsa villages, but these can be associated with certainty only with the post-AD 1785 villages in the area.

Ceramic technology: Knife River ware is the most abundant ware group occurring in all component assemblages in the Minnetaree phase. Knife River ware is the hallmark of the Knife River complex, and all components are classified as part of that complex. Companion wares include primarily Deapolis ware and lesser amounts of Transitional ware. Le Beau S-Rim ware continues to occur in moderate frequencies at both Big Hidatsa and Lower Hidatsa, perhaps due in both cases to admixture from older deposits. Decorative technique is predominantly by cord-impression in all collections, and check-stamped body surface treatment is virtually non-existent in these and in later phase collections. Body sherd mean thickness continues to increase through this temporal span, generally in proportion to the amount of Knife River ware in an assemblage. Mean thicknesses of 5.51 mm and 5.64 mm are posted for the two halves of this period. This increase in mean thickness is not thought to be attributable to a degeneration in pottery quality, but to gradually increasing frequency of Knife River ware as a distinct technological group.

Lithic technology: Arrowpoints continue to be predominantly side-notched in form, and such artifacts differ little in morphological detail from immediately earlier and later samples. Use of heat treatment remains relatively common in the early part of this phase, but such practices diminished substantially in the later part of the phase period. Heat treatment remains quite common at Lower Hidatsa and Mahhaha, but is very uncommon at other sites. The significance of such intersite variation is unclear, except that it possibly reflects the structure and strengths of previous Mandan cultural linkages. Use of KRF raw material in stone tools declines progressively through this period from a peak level in the preceding Willows phase. Use of exotic lithics with western sources remains relatively high, while downriver exotics are relatively uncommon, and use of local raw material other than KRF increases significantly. Increased utilization of local lithic sources accounts for the decreased use of KRF. The utilization pattern reflects continuing strong western connections, but also suggests increasing isolation of the villages from distant resource bases; this is perhaps linked to movement of hostile equestrian nomadic groups into the areas adjoining the trench. Bipolar technology continues to be infrequently used.

Several changes in lithic technology can probably be related to increasing influence from the fur trade during the Minnetaree phase. Small chipped stone tools become noticeably less common in the assemblages, relative to ground stone tools and large core and pebble tools. Use of unhafted, spall scrapers for hide preparation becomes increasingly more common. Evidence of tool recycling, perhaps indicating pressures on use of distant resources and loss of interest in knapping, increases substantially in this period. Stone tools evidencing work or contact with metal become noticeably more common in this period.

Bone technology: The basic repertoire of bone tools is the same as throughout much of the Plains Village tradition. Most changes in the makeup of bone tools in this phase can be attributed to influence from the fur trade. Awls become less and less common throughout this period, probably due to replacement by metal artifacts. Scapula tools and tools of expedient manufacture become somewhat more common. Roughly 40 percent of the classifiable tools exhibit modification from metal artifacts as opposed to stone artifacts. Bone knife handles fitted for metal blades occur.

Trade artifacts: Both metal artifacts and glass beads are still relatively rare but become increasingly more common throughout the Minnetaree phase. The composition of the metal artifacts changes somewhat from the previous period. Weapon parts appear for the first time, native-made conical and tubular copper ornaments are still quite common, and domestic items such as awls and knives decrease in relative frequency through this period. Manufactured ornaments appear for the first time late in this period. The mean size of glass trade beads decreases appreciably during this period. Layered drawn beads, uncommon in the preceding period, become equally as common as simple, unlayered beads. Cylindrical (unrounded) drawn beads become increasingly more common. Among small drawn beads, those with a clear/silver over white color become more common than blue beads, the reverse of the proportions in the previous phase. White and black beads become more common.

Remarks: This phase is named for the term "Minnetaree" used by the Mandans and applied by Lewis and Clark to the two subgroups of the Hidatsas who culturally dominated this period, those being the "proper Minnetaree nation"

(Hidatsas-proper) and the "Minnetarees, surnamed Metaharta" (Awatixas) (Coues 1965, 1:131). This phase unit is a subdivision of the larger taxonomic unit previously referred to as the Knife River phase (Lehmer et al. 1978) but now referred to herein as the Knife River complex. Most of the components recognized here in the Minnetaree phase were placed by Wood (1986b) in the Knife River phase and were suggested by him to have a somewhat later temporal association than is proposed here. The Minnetaree phase recognized here is a significant temporal and cultural period during which time the various subgroups of the Hidatsa tribe continued to grow in number and increasingly recognized themselves as belonging to a common tribal unit. This phase represents the historic period Hidatsas, their culture partially altered by indirect and direct Euroamerican contact, but effectively geographically separate and politically independent from the Mandans who were soon to move into the region for purposes of protection and defensive alliance.

The endpoint for this phase is intentionally chosen as immediately following the historically documented smallpox epidemic which swept the Plains and the continent around AD 1780-1781. This epidemic wreaked havoc on the Mandan, Hidatsa, and Arikara villagers in the Middle Missouri subarea. Immediately thereafter, under constant hostile pressure from predatory nomadic groups such as the Sioux, most of the villagers entered an extended period of village and settlement reorganization. This process of major population movement and reorganization across regional boundaries and traditional territories marks the beginning of the subsequent Roadmaker phase and major turning point in village prehistory. At about the end of this Minnetaree phase, trade relationships with Euroamericans take another turn, as well, with more regular, direct contact being established with northern trading posts sometime during the 1780s.

Roadmaker Phase

Previous name in this volume: Late Knife River Phase; Period 80, and particularly, Periods 81 and 82.

Components:
- Greenshield (32OL17) (Wood, ed. 1986)
- Black Cat (32ML5) (Wood 1986b)
- Fort Clark (32ME2) (Wood 1986b)
- Deapolis (32ME5) (Lehmer et al. 1978)
- White Buffalo Robe (32ME7), latest (Lee 1980)
- Amahami (32ME8), late (Dill 1975; Lehmer et al. 1978)
- Sakakawea (32ME11), time period 1 (Ahler et al. 1980; Weston 1986, 1990)
- Sakakawea (32ME11), time period 2 (Ahler et al. 1980; Weston 1986, 1990)
- Sakakawea (32ME11), time period 3 (Ahler et al. 1980; Weston 1986, 1990)
- Big Hidatsa (32ME12), time period 2 (Ahler and Swenson 1985a; Weston 1986, 1990)
- Rock Village (32ME15), early (Hartle 1960; Lehmer et al. 1978)

Geographic distribution: Roadmaker phase components are concentrated in the upper part of the Knife region, particularly at and just below the Knife River. A single component is known from the Garrison region.

Estimated age: AD 1785 to 1830. Three components have been dated by thermoluminescence analysis (Table 8.8). Two of the three dates have central tendencies which fall within the stated time period for the phase. Bracketing dates for the Roadmaker phase are chosen to reflect the beginning of the reorganization period immediately following the AD 1780-1781 epidemic and the approximate date when sustained, local fur trade contact began, respectively. Assignment of components to this phase is based primarily on oral traditions, historic documentation, intrasite stratigraphy, and trade and ceramic artifact content.

Settlement patterns: Villages in the Roadmaker phase are all highly nucleated, indicating packing of dwellings into small spaces for defensive purposes. Village areas vary considerably, from a minimum of circa 1.3 hectares at Amahami to a maximum of circa 4.7 hectares at Big Hidatsa and perhaps a comparable area at Fort Clark. House densities remain relatively high, ranging from circa 16 to 29 per hectare. Several settlements in this phase represent relatively short-term occupations, primarily in the years of settlement chaos and reorganization immediately following the 1780-1781 epidemic (for example, Greenshield, Rock Village, Black Cat, and possibly White Buffalo Robe). The remaining settlements represent relatively stable, continuous occupations which occurred throughout much of this period. For example, Fort Clark, Deapolis, Amahami, Sakakawea, and Big Hidatsa all contain occupation sequences which extend from the

Roadmaker phase into the subsequent Four Bears phase. From historic sources, the population of the Mandans and the Hidatsas can be estimated relatively accurately during this period. Wood (1977:339) estimates 1,730 Hidatsas and 1,216 Mandans in 1797-1798, and these respective figures probably remained relatively constant throughout the remainder of the period. These population levels for the respective cultural groups undoubtedly represent a considerable reduction from levels immediately prior to the 1780-1781 epidemic.

Houses were arranged in a somewhat random manner within settlements. Historic documents indicate that Mandan settlements typically contained a plaza or open area reserved for village ceremonies near the center of the village, and that a ceremonial lodge opened onto this plaza. No such feature was observed in Hidatsa settlements, and Hidatsa village-wide ceremonies were conducted outside the village proper. These contrasts in Mandan and Hidatsa community plan appear congruent with what can be seen on the ground in the traditional village sites.

Historic documentation indicates that major villages located on the high terrace margins were occupied primarily during the warm months of the year from spring until late fall. Temporary winter villages were constructed within timbered areas on the floodplain of the Missouri River, usually within a few kilometers of the permanent summer settlement. These winter villages might be used for a year or two at most, presumably being destroyed by flooding nearly every year. Few if any of these winter villages are known from the archeological record. A large number of non-habitation sites in the KNRI can be assigned to this phase, partly through historic documentation and partly through material content. Among these are trail complexes emanating from Amahami, Sakakawea, and Big Hidatsa, cemeteries on high ground west and north of the latter two villages, and various activity areas adjacent to the villages but just outside the major settlement boundary (see Table 25.1).

Fortifications: Historic documents indicate that all major settlements in this period were fortified with pickets or a palisade. Evidence for such fortification is often less than clear on the ground. A prominent fortification ditch system is evident at Rock Village, but this is the exception. An intermittent ditch-like feature occurs at Sakakawea, as it does at Big Hidatsa. At Sakakawea, this feature may represent a borrow area lying inside the palisade rather than a ditch dug outside the palisade.

Architecture: Historic documents are consistent in their detailed descriptions of a common earth-covered circular house form for all groups residing in the region. Houses were typically 12-15 m in diameter, having a central fireplace and a roof supported by a four-post arrangement around the hearth and multiple shorter posts farther from the house center. Leaning puncheons around the perimeter created an *atuti* storage area at the immediate margin of the house. Entryways typically faced to the center of the village or to the river. Archeological data from Rock Village and Amahami confirm most of these historically documented details. Dwellings used at this time appear to be nearly identical to those described by Wilson (1934). Smaller circular structures, requiring less elaborate construction, were used in winter settlements.

Subsistence patterns: Bison is the dominant vertebrate species present, and intensive use of the bison is well documented in historic records for the period. In described collections, wapiti and deer remains are also important, and canid, antelope, bear, and several small mammal species occur. Fish remains are common in the described collections from Rock Village, Amahami, and White Buffalo Robe (all samples are probably mixed to some degree); fish is a subsistence element that was rare in earlier collections from Hensler phase and Nailati phase components at White Buffalo Robe. The horse, commonly used by the villagers at this time, is rarely seen in the vertebrate bone samples from the villages. Plant remains include the cultigens corn, beans, and sunflowers. Also present are cucurbits, grape, plum, chokecherry, dock, rose, and buffalo berry. Limited botanical data from White Buffalo Robe reflect a deemphasis on cultigens relative to the Hensler phase, but this may be a product of sampling at that particular site.

Burial: Historic documents describe both scaffold burials and below-ground primary interments at locations outside of the villages for the Mandan and Hidatsa groups in this period. The latter burial mode is documented by several cemetery areas on high ground west of Sakakawea Village and north and northwest of Big Hidatsa Village. The cemeteries contain numerous small depressions in the ground surface representing sunken burial chambers. Below-ground burial was in a partially flexed position and the body was often covered with a wooden puncheon platform (cf. Weitzner 1979:286 for a description of traditional Hidatsa burial practices based on Wilson's ethnographic studies).

Ceramic technology: Knife River ware is the dominant pottery group present in all components, regardless of tribal association. A second common ware group is Deapolis Collared ware. Cord-impression continues to be the dominant decorative technique. All components in this phase express clear placement in the Knife River complex. Check-stamped surface treatment is virtually absent. Body sherd thickness increases substantially (mean for period 82 is 6.10 mm) over the previous phase period, possibly indicating a growing loss of interest in manufacture of native ceramics. Most ceramic details indicate strong continuity with the preceding phase components, with component assemblages in each phase differing only in relatively minor details. Some differences are statistically significant, however, and Mandan and Hidatsa subgroup assemblages can apparently be distinguished from each other on the basis of minor variations in rim form, lip shape, decorative type, brace shape, neck surface treatment, and other attributes.

Lithic technology: Substantial changes occur in lithic technology which can be attributed to continually growing popularity and presence of metal trade artifacts. Most of these changes mark a progression of patterns which first appeared a century or more earlier. A substantial decrease in relative frequency of KRF raw material occurs in this phase. A brief resurgence in use of downriver exotic materials occurs, perhaps reflecting movement of remnant Mandan groups into the region early in this phase period. Emphasis on western sources remains moderately high, and use of local sources is maintained at a relatively high level. Bipolar reduction is used only occasionally. A distinct decline in use of small chipped tools occurs, related to an increase in use of, particularly, ground stone tools. Expedient tools become increasingly more common. The use of large, unhafted, spall hide scrapers (as opposed to the smaller hafted end scraper) reaches a maximum in this period, presumably reflecting an expedient technological response to the demand for hides in the fur trade. Patterned ground stone tools become increasingly more common, with their manufacture perhaps made easier by use of metal tools. Particularly distinctive are circular and square ground stone tablets of uncertain function, and symbolic or ceremonial stone hammers (attributable to the Hidatsa Stone Hammer Society) which occur at Big Hidatsa and Rock Village. Chipped stone tool recycling becomes increasingly more common, by the end of this period occurring in more than 4 percent of the tools. Stone tools used to modify or contact metal objects become maximally common late in this period.

Bone technology: An extensive and varied bone technology is apparent in excavated collections from the Roadmaker phase. Functional variability is probably no greater than in previous periods, but the described artifact samples are quite large (cf. Lehmer et al. 1978 and Weston 1986, 1990). Traces of manufacture left on bone artifacts indicate that metal implements were more commonly used to manufacture bone tools than were stone implements. This reflects a nearly complete transformation of the traditional, lithic-based technological infrastructure into a technological base dependent upon the fur trader. Scapula tools are particularly common, as are expedient bone and antler implements, while bone awls exhibit very low frequencies of occurrence, culminating a decline which began more than a century earlier.

Trade artifacts: Trade artifacts are markedly more abundant in the Roadmaker phase than in the previous period. This is directly attributable to establishment and maintenance of direct trade contacts during this period, and establishment of several short-lived trading posts in the region in this period. Trade goods were flowing into the region in larger amounts and in more varied forms than ever before. Lehmer et al. (1978) and Wood and Thiessen (1985) illustrate some of the tremendous array of Euroamerican artifacts reaching several of the villages in this phase, although many of the artifacts they illustrate probably derive from the subsequent Four Bears phase. Metal artifacts as a group show a steady increase in frequency in this period, while beads, as a group, do the same but at an even more accelerated pace late in the period. The composition of metal artifacts is modified considerably from that in the previous period, reflecting the shift to frequent direct trade contact. By the latter part of this period, domestic items and weaponry occur in about equal frequencies in the archeological record, and manufactured ornaments are abundant. Native-made ornaments (e.g., rolled copper cones and tubes) are relatively less common than before. Glass bead assemblages continue to exhibit a smaller and smaller mean size. Small, drawn monochrome beads again become more common than polychrome or compound structure beads. Cylindrical forms are quite common in small, drawn beads. Blue beads increase in frequency while clear/silver over white compound beads decrease in frequency. Blue beads as a general group become more homogeneous in color variation.

Remarks: This phase is named after Roadmaker, a renowned Hidatsa tribal council member and leader of the Awaxawi subgroup of the Hidatsas who resided at Amahami Village (Bowers 1965:375-380). Roadmaker was a respected tribal elder in 1833 when he was interviewed by Maximilian and when his portrait was painted by Bodmer (Thomas and Ronnefeldt 1976:178-179, 208-209; Goetzmann et al. 1984:315). One of Bowers' informants reported (1965:380) that Roadmaker died shortly after the 1837 smallpox epidemic. Amahami Village, Roadmaker's place of residence, was established at Knife River early in this phase, and was occupied throughout the remainder of the phase. We can surmise that Roadmaker was a leader at Amahami Village throughout much of this phase period, and that the material culture at Amahami is particularly representative of this phase.

Initiation of settlement reorganization and chaos which immediately followed the AD 1780-1781 smallpox epidemic marks the beginning of this phase. This phase reflects the period when the Mandan remnants from Heart River reorganized and migrated to Knife River, settling there for much of this period in a protective alliance with the more numerous Hidatsa groups. Hidatsa (Knife River complex) material culture and stylistic attributes dominate the ceramic technology of all groups, but historic records indicate that all groups managed to maintain strong tribal, and in some cases, subtribal, identities through this period. This phase period is also marked by the initiation of direct and relatively frequent trade activity between Indians and whites, first with Canadian traders from the north and then with St. Louis-based firms (cf. Wood and Thiessen 1985). Major transformations of many aspects of native lithic and bone technology occurred during this period, and that is one of the distinctive features of the Roadmaker phase. It is also during this time that the Mandan and Hidatsa villagers probably maximized their role as middlemen between the western hunters and the Euroamericans in the fur trade. This phase ends in about AD 1830, a point in time marking the approximate beginning of yet another stage in rapidly evolving trade relations, particularly, the shift to continuous local trade contact at permanent trading posts established at the villages.

All the major village components noted here as assigned to the Roadmaker phase (with the exception of Greenshield) have also been assigned by previous workers (Lehmer 1971; Lehmer et al. 1978; Wood 1986b) to the Knife River phase, which we would here term the Knife River complex.

Four Bears Phase

Previous name in this volume: Late (or Terminal) Knife River Phase; Period 80, and particularly, Period 83.

Components: Fort Clark (32ME2) (Wood 1986b)
Deapolis (32ME5) (Lehmer et al. 1978; Thompson 1961)
Boller (32ME6)
Amahami (32ME8), late (Dill 1975; Lehmer et al. 1978)
Sakakawea (32ME11), time period 1 (Ahler et al. 1980; Weston 1986, 1990)
Big Hidatsa (32ME12), time period 1 (Ahler and Swenson 1985a; Weston 1986, 1990)
Taylor Bluff (32ME366), late (Ahler et al. 1983; Ahler 1988))
Rock Village (32ME15), late (Lehmer et al. 1978; Hartle 1960)
Star Village (32ME16) (Metcalf 1963a)
Like-a-Fishhook (32ML2) (Smith 1972)

Geographic distribution: Four Bears phase components extend from the mouth of the Knife River in the Knife region upstream to the central part of the Garrison region. The downriver sites are generally earlier in this phase period, and the upriver sites reflect population movement of the same ethnic groups up the Missouri River later in time.

Estimated age: AD 1830 to 1886. One component has been dated by thermoluminescence analysis (Table 8.8). The bracketing dates for the Four Bears phase have been set as beginning slightly after the initiation of the "local trade period" (cf. Chapter 13, this volume) and ending at the time of allotment and abandonment of Like-a-Fishhook Village in 1886. Component inclusion within this phase is based on historic documentation, artifact content, and stratigraphic position within multicomponent sites.

Settlement patterns: A process of active settlement reorganization accompanied by a certain degree of chaos occurred during much of this phase. Historic documentation (Stewart 1974:296) indicates that Amahami and Sakakawea villages burned in the spring of 1834 and may have been abandoned thereafter, with the residents relocating elsewhere. Several of the smaller settlements including Boller, Rock Village, and Taylor Bluff represent severely depopulated remnants of once large communities which survived the AD 1837 smallpox epidemic. Settlements range in size from about 1.7 hectare at Taylor Bluff to about 2.5 hectare at Big Hidatsa (after AD 1837) and perhaps 3.5 to 7.0 hectares at various times at Like-a-Fishhook. Communities remain densely settled, with densities of circa 18 houses per hectare evident at Big Hidatsa, 25-30 houses per hectare at Fishhook, and perhaps 30 per hectare at Rock Village. House density at Fort Clark is relatively low, being about 13 houses per hectare. Historic records indicate that Mandan and Hidatsa populations were severely reduced by the AD 1837 smallpox epidemic. The Mandans may have lost as much as 75 percent of their population, while the Hidatsa loss was probably lower, on the order of 50 percent or less. Several estimates (cf. Chomko 1986:90-92) place the post-AD 1837 Mandan population at 250-300, and the Hidatsas at 1,000-1,200, although it is unclear if such estimates take into account mixed villages comprised of remnant groups from both tribes.

Fortifications: Historic records again indicate that all settlements were fortified by a palisade line surrounding the village perimeter. Archeological evidence of such features is not clear at most sites, as noted for the previous Roadmaker phase. Such evidence is most clear at Fort Clark, Star Village, Taylor Bluff, and Fishhook.

Architecture: The comments on architecture for the preceding Roadmaker phase apply here as well. All village groups in this phase used the basic four center post, circular earthlodge, with variations for winter dwellings. At Fishhook and Fort Clark, log cabins patterned after the Euroamerican model were in wide use by the mid and latter parts of this phase (Smith 1972:28-29; William Jacob Hays' 1860 sketch of part of the Fort Clark Village adjacent to Fort Primeau in Taft 1953:Illustration 19). Smith (1972:33) reports minor differences in Mandan/Hidatsa and Arikara architecture at Fishhook.

Subsistence patterns: The patterns noted for the preceding Roadmaker phase apply here as well. Most of the site collections discussed under the preceding phase are actually comprised of mixed materials from both the Roadmaker and Four Bears phases.

Burial: The comments provided in the previous section on the Roadmaker phase apply here as well, particularly for cemeteries associated with the Mandan and Hidatsa villages which contain occupational sequences which overlap the two phases. Arikara burial at Fort Clark was predominantly in subsurface pits, with a low earthen mound constructed over each individual grave. Numerous such burial locations attributed to the Arikaras have recently been recorded in a study by the University of Missouri-Columbia in the area west of Fort Clark Village proper. Few specific data are available on burial practices late in this phase, when the villagers became increasingly influenced by Euroamerican culture, and presumably, burial practices. Both scaffold and pit burials are reported for Fishhook.

Ceramic technology: Major changes in ceramic technology and quality occur in the Four Bears phase. Knife River ware remains the dominant ware group, accompanied by Deapolis ware in lesser frequency. This typological pattern exists in all components, regardless of ethnic affiliation, causing uniform assignment of all components to the Knife River complex. Other definable ware groups occur in very low frequency. Decoration on Knife River ware and other wares changes significantly, with plain decoration becoming much more common, and with cord-impression less frequently used. Pottery abundance and quality deteriorate significantly, presumably reflecting a lack of interest in native ceramic manufacture caused largely by availability of metal trade vessels. Mean body sherd thickness increases substantially in this period from a previous mean of 6.10 mm to a mean of 6.55 mm (7.84 mm at Fishhook, one of the latest components). The process of technological deterioration, which apparently began only after about AD 1785, is accelerated in this period.

Lithic technology: Substantial changes in lithic technology occur in this period. Most of these changes can be attributed directly or indirectly to Euroamerican contact. Bipolar flaking is commonly used, it being perhaps an expedient reduction technique practiced by people who had lost or never learned more refined knapping skills. The relative frequency of KRF raw material continues to diminish in this period. Local materials are more abundantly represented in flaking debris, and western sources are more abundantly represented in chipped stone tools. Tool recycling becomes yet more common. Large, expedient, unhafted, spall hide scraping tools remain common in this period. Expedient tools become yet more common, and ground stone tools become considerably more common relative to all chipped stone forms. The ground stone tool industry seems to remain largely intact throughout this period, while the chipped stone industry shows the most dramatic deterioration under influence from trade contact. Chipped lithic items diminish in overall abundance during this period, and are virtually nonexistent in the latest samples from Fishhook Village.

Bone technology: The bone technology remains a relatively strong component of overall material culture, at least in the early part of this period. Many of the collections discussed by Lehmer et al. (1978) derive, in fact, from mixed Roadmaker and Four Bears components from single sites, and comments made previously about Roadmaker bone technology apply here as well. Most bone tools are manufactured with the use of metal rather than stone implements. Bone can be more easily worked with metal implements than with stone implements, and this probably accounts for the persistent diversity of material culture in the bone/antler medium until near the end of this period.

Trade artifacts: Many of the temporal trends noted for the previous Roadmaker phase pertain here as well, in accentuated form. The diversity of trade artifacts is quite large, owing largely to improved transportation into the region after AD 1832 via steamboats from the major trading center at St. Louis. Most of the data on both metal composition and beads come from components predating AD 1850, so the generalizations provided here may not be applicable to the latter part of the phase period. Both metal artifacts and glass beads increase in frequency in this period, but beads increase proportionately the most. The functional composition of metal tools reflects that weaponry is the dominant group, with manufactured ornaments comprising the next most common group. Native-made ornaments occur at an all-time low frequency. Beads continue to decrease in overall or mean size. Small, drawn beads with simple structure are increasingly more common relative to frequencies of compound, multilayered forms. Cylindrical, unrounded small drawn beads are less common than before. Small blue beads continue to increase in relative frequency. Simple, pure white beads are also more common than before, particularly relative to compound clear/silver on white forms.

Remarks: This phase is named both for Four Bears, the Mandan, a well-known leader at Fort Clark Village who died in the AD 1837 epidemic (Abel 1932), and also for Four Bears, the Hidatsa, an Awatixa war chief who was instrumental in the founding of Like-a- Fishhook Village in AD 1845 (Bowers 1965:37-38). This phase is intended to accommodate all components of Mandan, Hidatsa, as well as Arikara tribal units in the region; all groups shared a somewhat common material culture which was drastically altered by the process of contact with Euroamericans. The ceramic technology exhibits clear evidence of deterioration and alteration in this period, and lithic technology is greatly changed, reflecting the end point of a process begun some centuries earlier.

The beginning date for this phase period is chosen to approximate the beginning of sustained direct contact between Indians and whites, and the approximate time at which the villagers' role was altered from that of middlemen in the regional trade to that of provisioner and supplier for permanent trading posts and nomadic groups in the region. It was in the period 1829-1832 that the American Fur Company built a series of permanent posts on the Upper Missouri which operated continuously for several decades thereafter as the central nodes in the fur trade. Thus, this phase is marked by distinctly increased dependency by the villagers on raw materials and technology provided by the trading posts. Many aspects of native subsistence and settlement structure remained relatively intact, however, throughout this period, until the allotment process which marks the end of this period when the settlement at Like-a-Fishhook was abandoned.

REVISED TAXONOMIC ASSIGNMENTS FOR COMPONENTS IN THE KNRI

At the close of Chapter 4 in this volume, which deals with the KNRI cultural resource inventory program, a table (Table 4.1) was provided which summarized the culture-historic placement of each of the 56 discrete archeological and historic sites recorded within the boundaries of the KNRI. Through the course of the various studies reported in subsequent sections in this volume, the culture-historic structure or taxonomy for the region has been revised considerably, and, along with it, the taxonomic assignments associated with various components at sites within the KNRI. This is particularly true for the numerous Plains Village tradition sites in the KNRI where excavation has occurred. To set the record in accord with the new culture-historic structure which is explained in this chapter, Table 25.2 in this chapter provides a revised culture-historic classification for components at the 56 cultural resource sites presently known from the KNRI. This table lists the classification of each site in the KNRI according to major cultural tradition, cultural complex, phase, and ethnic tradition (Mandan or Hidatsa subgroup affiliation). The major modifications presented here, in comparison with the previous assignments, have to do with complex and phase associations posited for the various components at each site.

Table 25.2. Summary of revised culture-historic classifications of sites recorded in the Knife River Indian Villages National Historic Site.

		Cultural Tradition					Cultural Complex			Phase Association							Ethnic Tradition			
Site Number (32ME_)	Site Name	Unknown	Preceramic	Pre-Village	Plains Village	Euro-american	Painted Woods	Heart River	Knife River	Nailati	Scattered Village	Hensler	Willows	Minnataree	Roadmaker	Four Bears	Awatixa	Hidatsa-proper	Awaxawi	Mandan
9	Buchfink	-	-	X	X	X	X	-	X	X	-	-	-	-	X	X	X	-	X	-
10	Lower Hidatsa	-	-	X	X	-	-	X	X	-	-	X	X	X	-	-	X	-	-	-
11	Sakakawea	-	-	-	X	-	-	-	X	-	-	-	-	-	X	X	X	-	-	-
12	Big Hidatsa	-	-	X	X	X	X	-	X	-	X	-	X	X	X	X	X	X	?	?
310	Bihohka	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
311	Black Owl	-	-	-	X	-	X	-	-	-	?	-	-	-	-	-	X	-	-	-
312	Madman's Bluff	-	-	-	X	X	X	-	-	-	?	-	-	-	-	-	X	-	-	-
366	Taylor Bluff	-	X	-	X	X	X	-	X	-	?	-	?	-	-	X	X	?	?	?
383	Running Deer	-	-	-	X	-	X	-	X	-	?	-	?	?	?	?	X	X	-	-
407	Poly	-	-	X	X	X	X	-	-	-	X	-	-	-	-	-	X	-	-	-
408	Elbee	-	X	-	X	X	X	-	X	-	?	-	-	-	-	?	?	?	?	-
409	Scovill	-	X	-	X	X	X	-	X	-	X	-	-	-	X	X	X	-	-	-
410	YCC	-	-	-	X	-	X	-	-	-	?	-	-	-	-	-	X	-	-	-
411	Lobodi	X	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
412	Hotrok	-	-	X	X	-	X	X	?	-	-	X	X	?	-	-	X	-	-	-
413	Forkorner	-	-	X	X	-	X	-	-	-	X	-	-	-	-	-	X	-	-	-
414	Hump	-	-	X	X	-	X	-	-	-	X	-	-	-	-	-	X	-	-	-
415	Youess	-	-	X	X	-	X	-	-	-	X	-	-	-	-	-	X	-	-	-
416	Elder	-	-	-	X	-	X	-	-	-	?	-	-	-	-	-	X	-	-	-
464	Yellow Bear	-	-	-	X	X	X	-	-	-	?	-	-	-	-	-	X	-	-	-
465	Metsiroku	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
466	Karishta	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
467	Hadu Nowassa	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
468	Hadu Duupa	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
469	Hadu Nawi	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
470	Hadu Topa	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
471	Hadu Kexu	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
472	SGB	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
473	NaxpikE	-	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-
474	Rokhohl	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
475	Bedi Ari	-	-	-	X	-	-	-	X	-	-	-	?	?	?	?	-	X	-	-
476	Hidatsa Northern Trail Complex	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-
477	Hidatsa High Bench Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-

Table 25.2. Concluded.

		Cultural Tradition					Cultural Complex			Phase Association							Ethnic Tradition			
Site Number (32ME_)	Site Name	Unknown	Preceramic	Pre-Village	Plains Village	Euro-american	Painted Woods	Heart River	Knife River	Nailati	Scattered Village	Hensler	Willows	Minnataree	Roadmaker	Four Bears	Awatixa	Hidatsa-proper	Awaxawi	Mandan
478	Hidatsa Hilltop Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-
479	Hidatsa Long Ridge Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-
480	Hidatsa Low Bench Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-
481	Hidatsa Trail Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-
482	Grannis School Place	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
483	Fowler Farmstead	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
484	Scattered Board	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
485	Old Corral	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
486	Rusted Stove	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
487	Lower Hidatsa East	-	-	-	X	-	X	?	?	-	?	?	?	?	-	-	X	-	-	-
488	Lower Hidatsa South	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
489	Nash	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
490	Lower Hidatsa North	-	-	-	X	-	X	?	?	-	-	?	?	?	-	-	X	-	-	-
491	Sakakawea Southwest	-	-	-	X	-	-	-	X	-	-	-	-	-	X	X	X	-	-	-
492	Soni	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
493	Sakakawea Cemetery	-	-	X	X	-	-	-	X	-	-	-	-	-	X	X	X	-	-	-
494	Sakahami Trail	-	-	-	X	-	-	-	X	-	-	-	-	-	X	X	X	-	X	-
495	Sakakawea Trail Complex	-	-	-	X	-	-	-	X	-	-	-	-	-	X	X	X	-	-	-
496	Ramble	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
497	Selca	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
498	Smaul	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
499	Lower Hidatsa West	-	-	X	X	-	-	X	X	-	-	?	X	?	-	-	X	-	-	-
787	Baker Cemetery	-	-	-	X	-	-	-	X	-	-	-	?	?	X	X	-	X	-	-

ETHNIC TRADITIONS

The treatment of ethnic traditions is confined here to the presentation of a time/space model in the form of a tree diagram which expresses the origin traditions documented in the historic, ethnographic, and archeological records for the various ethnic subgroups who have occupied the part of the Missouri River valley under investigation here. Such a diagram is presented in Figure 25.3. This is intended to be no more than a working model of ethnic group developments and migrations for the study area. A large number of the archeological components can be assigned to the various ethnic traditions represented in the figure, and such assignments are listed in Table 25.1 along with the phase and complex assignments for each component. These assignments are made through consideration of all combined archeological and historic information, giving greatest weight to the oral traditions of the ethnic groups themselves recorded in the historic record.

The primary sources of information for developing the ethnic tradition model in Figure 25.3 consist of the ethnohistorical interpretations by Bowers (1948, 1950, 1965), Stewart (1974), Wood (1986a), and Chomko (1986). Bowers collected, collated, interpreted, and summarized oral tradition data for both the historic Mandans as well as the Hidatsas. Stewart (1974:289) notes that much of the information developed by Bowers on this subject was collected independent of other major sources, and that congruence among the independent sources adds confidence that Bowers' interpretations are basically correct. Virtually all of the studies cited above rely on Bowers' research as the basic interpretative source for the broader picture of ethnic group developments, and, for that reason, Bowers is relied upon particularly heavily in the present context. Stewart (1974) provides a particularly useful condensation of information contained in Bowers and other sources concerning the main ethnic subunit organization at different time levels in the Missouri valley, but Stewart's discussion of archeological component assignments to various ethnic subunits is particularly erroneous for most Hidatsa tradition components predating AD 1800. The archeological associations presented here in Table 25.1, based on data developed throughout this study, are thought to be far more reliable.

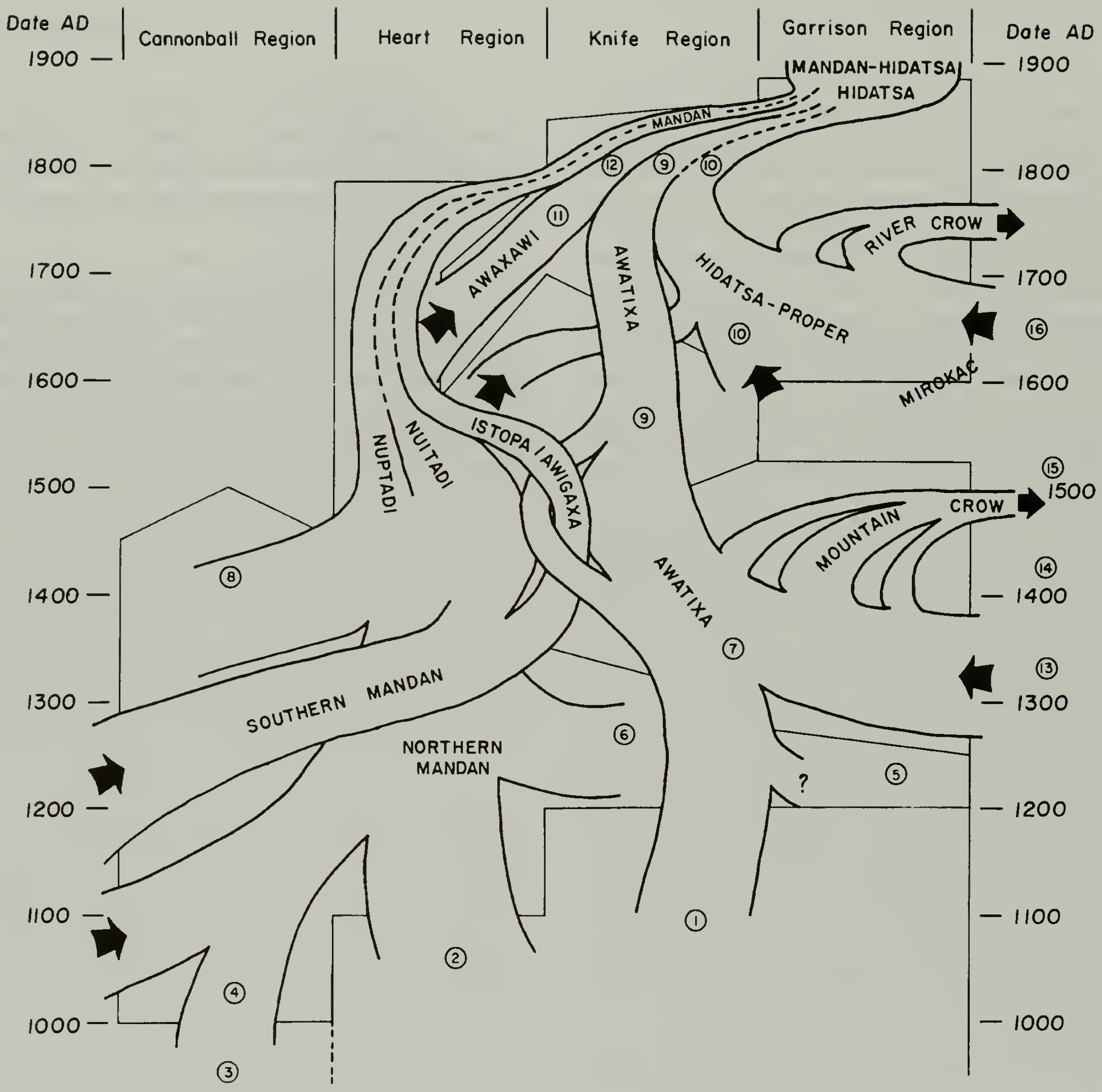
The main focus here is on the ethnic traditions of the historic Hidatsa tribal unit, but because of the geographic extent of the present study, the ethnic makeup and development of the Mandans is also touched upon in somewhat less detail in Figure 25.3. A detailed interpretation of the information condensed into Figure 25.3 and Table 25.1 would comprise an additional lengthy chapter; time does not allow the production of such an effort for this volume. It must suffice at this time to merely reiterate the basic structure and historical organization of the ethnic traditions for the study area.

With particular reference to the Mandans, oral traditions clearly indicate a complex record of development and migrations involving multiple subtribal ethnic units having distinct origin traditions and histories. Within the present geographic context it seems that two basic subdivisions existed quite early in time, one of these being a core group of "Northern Mandans" who settled in the Heart region at an early date. We call them Northern Mandans because they occupied a more northerly position in the Missouri valley early in time. The origins for this group probably lie in part in indigenous Charred Body complex (late Woodland) populations, and in part in migrations into the region of peoples having a fully developed Plains Village culture. Early in time a second group of "Southern Mandans" migrated into the general area. We call them Southern Mandans because for some time they occupied more southerly positions along the Missouri valley, in what is now South Dakota. Travelling from places far south along the Missouri River, they eventually settled in part in areas near and upstream from Square Buttes in the southern part of the Knife region, at locations generally upstream (north of) the Northern Mandans.

At a somewhat later point in time, perhaps in the AD 1500s, the oral traditions suggest the existence of at least four subgroups of Mandans who carried specific subgroup names, identified in Figure 25.3 as the Nuitadis and Nuptadis (deriving from original Northern Mandan populations) and the Istopas and Awigaxas (deriving from original Southern Mandan populations). Stewart refers to the latter two as the "northern Mandans" because by AD 1500 or so they apparently occupied joint villages located in the upstream or northern end of the Mandan territory. They in fact, however, seem to derive in large part from our earlier Southern Mandan subgroup, having origins far south along the Missouri River. The Nuitadi subgroup was the most numerous, traditionally occupying several right bank villages near Heart River. The Awigaxa and Istopa groups may have resided together, but at least three residentially distinct groups still existed up until the major disruption caused by the AD 1780-1781 epidemic. Thereafter, two residentially distinct Mandan groups existed, dominated by the Nuptadis and the Nuitadis, with the latter group having absorbed the remnants of the smaller subgroups. These two subgroups remained residentially distinct until about AD 1860, at which time final consolidation occurred at Like-a-Fishhook Village.

Figure 25.3 provides the author's graphic interpretation of the traditional ethnic history of the various subgroups of the Hidatsas as gleaned from the studies of Wood, Bowers, and Stewart, and the archeological data studied here in some detail. The three main branches of the Hidatsas are represented, these being the Awatixas, Awaxawis, and Hidatsas-proper. The author would trace the Awatixa branch through the complete culture-historic sequence in the Knife region, placing its origin in part in what may be indigenous populations assignable to the Charred Body complex, and also in early populations who migrated into the region during the period encompassed by the Painted Woods complex. The two separate emigrations of Mountain Crow and River Crow subgroups are accounted for, these being separated in time by roughly two centuries. The Hidatsa-proper and Awaxawi branches of the Hidatsas have relatively short histories in the study area, their initial appearance being accounted for by immigrations of populations into the Heart and Knife regions at around AD 1600. These three main subgroups of Hidatsas, in contrast to the Mandans who apparently saw themselves as more of a single tribal unit, maintained what were essentially separate tribal identities until late in the AD 1700s, at which time the need for alliance for defensive purposes overcame the desire for independence among the various groups. Until as late as AD 1805 the Awaxawi subgroup was recognized by Euroamerican visitors as a linguistically, politically, and ethnically distinct tribal unit. Separate residential bases were maintained by all three Hidatsa subgroups until at least as late as AD 1834. By 1845 they had amalgamated into a single residential unit at Fishhook Village.

By AD 1886 substantial intermarriage had occurred among remaining Mandan and Hidatsa peoples (cf. Bowers 1965:67-69). The sense of separate ethnic identity at the subgroup and tribal level was undergoing change, and the twentieth-century ethnic referrent to a Mandan-Hidatsa tribal association was rapidly emerging.



1. Flaming Arrow (32ML4)
2. Menoken (32BL2)
3. Jones's Bay (39CA3)
4. Helb (39CA208); Jake White Bull (39CO6)
5. Grandmother's Lodge (32ME59)
6. Clark's Creek (32ME1)
7. Cross Ranch (32OL14); other Nailati phase sites
8. Huff (32MO11)
9. Lower Hidatsa (32ME10)
10. Big Hidatsa (32ME12)
11. Molander (32OL7)
12. Amahami (32ME8)
13. Schultz (32RN215)
14. Nollmeyer (24RL1225)
15. Hagen (24DW1)
16. Sharbono (32BE419); Hintz (32SN3)

Figure 25.3. Space-time tree diagram showing the spatial and temporal extent of ethnic traditions encompassed within and developing into the historically recognized Mandan and Hidatsa tribal groups in North Dakota. The ethnic traditions are superimposed on the structure of cultural complexes for the same geographic area shown in Figure 25.1. Bold arrows indicate episodes of substantial population migration into or out of the illustrated geographic area. Dashed lines between branches indicate the existence of residentially discrete tribal subgroups which recognized a tribal membership shared with other subgroups. Numbers indicate certain archeological sites both within and outside the Knife region, selected to illustrate the author's current suppositions about historical developments and broader cultural interactions. A more complete listing of ethnic tradition classifications for archeological sites within the Knife and Garrison regions is provided in Tables 25.1 and 25.2.

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CHAPTER 26

THE KNIFE RIVER INDIAN VILLAGES PHASE I RESEARCH PROGRAM FROM THE PERSPECTIVE OF TWO PARK MANAGERS

Sandra Key and Michael Holm

Editor's note: Five individuals have served as Superintendent of the Knife River Indian Villages National Historic Site. The first manager, Russell "Clay" Alderson, was assigned to the park in 1975. He was succeeded by Earle Curran, Sandra (Hellickson) Key, Mick Holm, and, since March, 1993, Charles Cartwright. Mick Holm had also earlier (December, 1977, through July, 1979) served as Park Historian. The combined tenure of Key and Holm spans 11 of the 19 years the park has been in existence, encompassing the latter stages of the park's development when the results of the Phase I research program played an important role in the management decision-making process. Below, Sandra Key, Superintendent from December, 1980, through July, 1984, and Michael Holm, Superintendent from March, 1985, to November, 1992, separately share their views of the research program.

SUPERINTENDENT KEY

I arrived as the third Superintendent of Knife River Indian Villages in December, 1980. I was surprised and pleased to learn that there was a major archeological research project underway. As I attempted to learn about my new assignment and park, I found there was little yet committed to paper concerning the project but there were some impressive research reports being worked on. Park staff were excited by the research efforts but were overwhelmed by the scope and complexity of the technical findings. Outside of the park itself, little interest in or knowledge of the effort existed. I suddenly began to question my own skill in trying to set management objectives for a park that few seemed to know much about. To chart the park's future I determined that I would use my greatest resource—the enthusiastic, if small, staff—and I began to ask questions about the research. Much of their enthusiasm stemmed from the exciting interpretive opportunities that had brought visitors to watch the actual excavations in progress. They, like myself, were somewhat taken aback as we pulled individual reports off the shelves and tried to decipher their meaning. As spring approached and our contacts with the principal investigator, Dr. Stanley Ahler, and the Midwest Archeological Center increased, the staff and I began to develop an overwhelming sense that Knife River Indian Villages was more than simply another Lewis and Clark site. As I probed the "meaning" of the Knife River Indian Villages, the modest and scientific answers began to take on a nature that caused me to believe the National Park Service had, in addition to purchasing an important site relating to the Lewis and Clark Expedition, also (and almost inadvertently) acquired the ancestral home of the Mandans and Hidatsas, two of the most important native peoples of the Plains. I began to hear statements like "possibly one of the longest continually occupied sites of Plains Villagers" and even, "the total span of occupation of the area may be 6,000 years or more."

In total, well-intended naiveté, I ascertained that we ought to see how the present-day Three Affiliated Tribes (which include the Arikara people) felt about all this. After some initial contacts that suffered from a lack of understanding of their culture, we were successful in making meaningful contacts with the Tribes. While they remained skeptical of "white man's" archeology, I sensed a deep and genuine gratitude that we were beginning to understand what they already knew: the true significance of the Knife River Indian Villages National Historic Site—as the name suggests—lay not in the fact that the Lewis and Clark Expedition spent a cold winter with some Indians on the bank of the Missouri River, but rather that this site was the ancestral home of one of the most successful cultures to ever adapt to the rigorous Northern Plains environment.

At this juncture, I realized that the archeological research effort was absolutely fundamental to the management of this historic site. The reader should understand that the research had been underway for nearly five years. Nonetheless, I began to see the research program as the single most important event that would shape Knife River's future. With that clear premise, I began to delve into not only the administrative aspects of the Knife River research program but also the thought processes and people that created it. What I learned about that research program has served to guide all of the research efforts I have been responsible for from then on. I learned that the archeological research program was based on a series of clear objectives that would provide park management with an incredibly comprehensive understanding of the basic resources of the park, their location, and their significance. It would also produce a written record and museum collection that would be of international significance as a study collection. To do this the overseers of the program provided for and encouraged "state of the art" technology. The actual research plan and implementing contacts with the University of North Dakota were masterful in setting down clear mileposts by which we could measure accomplishments and, if needed, adjust future research work. But no research plans or contracts no matter how carefully crafted will produce the desired products unless the best talent is found to do the research. Indeed, by this point I was convinced that through an incredible combination of vision and administrative know-how, Knife River Indian Villages had one of the finest, ongoing research efforts in the National Park Service. Furthermore, as Superintendent of the park for which this "treasure trove" of information was unfolding, I had a responsibility to immediately begin to use the results of the research, not just before the reports got dusty on our library shelves but before they even had the binder rings put on them.

But how could the park use information that was generally technical, not readily available, and in many cases still being produced? Three management events unfolded that seemed to provide the perfect avenues to use the Phase I research program to set this small park on the right track for the future. First, the environmental impact statement (EIS) for the new visitor center location was "on the street" for public review. Secondly, the Washington Office had deemed necessary the rewrite of both the cultural and natural resource management plans. Lastly, the park needed desperately to improve its relationships with the Stanton community and with the Three Affiliated Tribes.

The most immediate need was to reconsider the EIS for the visitor center in light of the immense amount of new resource information. Rethinking the location recommended in the EIS for the new visitor center was not a popular step. No one, including myself, wanted to do anything that might delay funding for new park facilities. I was keenly aware that the old farmhouse with its attendant outdoor "john" was not going to help Knife River improve its visitation! Besides, how do you explain to the public that a document that isn't even a year old is no longer based on current information? Fortunately, two events were coming together for the park. The community of Stanton had begun to explore the possibility of promoting visitation to the park. This interest was the result of a mix of local people with different purposes. A small but energetic group formed to chart their political strategy. Foremost in that strategy was the need to gain Congressional interest in funding a visitor center for the park. They quickly recognized that Congressional interest in Knife River would be greatly increased if the Three Affiliated Tribes were also supportive of the park.

A potentially major hurdle to their strategy soon began to become apparent. Although the tribal leaders, including the tribal elders, were beginning to take an active interest in the park, there was strong distrust of the National Park Service's intentions. Paramount in this distrust was the fact that the preferred alternative for the visitor center, as proposed in our planning documents, was a known tribal burial site. Burial sites were often located on hills so they would overlook nearby villages, but close enough so that relatives would have convenient access to "spend time" with the deceased. Of course, a well-sited visitor center location would require essentially the same conditions—some height so visitors could better view the village remains, yet close enough to be within comfortable walking distance in North Dakota's infamous weather extremes. And yes, you guessed it, if there was to be tribal support of the Stanton-based Friends of Knife River, the National Park Service was going to have to revisit the decision on the visitor center's location.

The location of the visitor center became a symbol not just to the tribal leaders but to many who saw that decision as making a much larger statement about what the park would represent. We on the staff knew we had the opportunity to make Knife River Indian Villages National Historic Site much more than a site that commemorated the history of white settlement of the West. Many activities occurred including feasts, traditional craft demonstrations, celebrations, community/tribal get togethers, and by 1984 everyone realized that a new location for our visitor center was a "done deal." A new EIS was prepared, a new site was surveyed for archeological material and the selection of "Site B" as the preferred location was made. While it took public interest and tribal concern to give energy to this issue, making it happen smoothly and efficiently took knowledge—knowledge of where the resources were. Had we not suspected that there were human remains in our first location and had we had no idea what archeology we might encounter in other locations, it would have been very difficult to convince anyone to move the visitor center. Without actual knowledge of the resources, there would have been intense argument and counterproductive points of view—neither of which would have been based on firm information. Instead, because of the research program we had at our fingertips exact locations and detailed information on what archeological resources existed in what areas. We were able to select Site B and define its boundaries within a few meters of significant resources.

This experience taught me something important. Most of us who manage resources have so little information on those primary resources that we are afraid to make changes in major decisions because normally the new decision has as many ramifications for the resources as had the old decision. But this was not the case at Knife River Indian Villages. The visitor center today is located in a less resource-sensitive location within the park because of the resource information we had.

An important by-product of the public's interest in the visitor center location was the increased respect the National Park Service gained because of the accurate and in-depth information we had at our fingertips. Instead of giving excuses and maybe's, alternative locations for the visitor center were discussed openly and we were able to speak with exact knowledge of what the resource impact in different locations would be and therefore what the Service's position was. We were able to lay maps in front of community organizations and tribal leaders and discuss the trade-offs in a way that was understandable.

Simultaneously, the park interpreter began to see the need to broaden the park's interpretive emphasis from the Lewis and Clark period to the culture and history of the Mandan, Hidatsa, and Arikara peoples. Strong linkages were made with tribal elders to assure that as we tried to interpret or even re-establish traditional skills like pottery making, we did it in a way that would help build bridges between the park and the tribe.

To summarize, the end results of the process to select a different site for the visitor center were: 1) improved relations with the tribe; 2) increased interest in and appreciation of the park by local residents; 3) a visitor center location that provided for both resource protection and visitor use.

Writing the cultural and natural resource managment plans for the park offered the National Park Service the opportunity to both "institutionalize" the results of the archeological program and provide the flexibility to incorporate future findings and conclusions. Although most parks developed very separate documents for managing cultural and natural resources, we agreed at Knife River, where these kinds of resources were so intertwined, that it would be most effective to write two separate but cross-referenced documents. The park called upon the assistance of Tom Thiessen of the Midwest Archeological Center to spearhead the development of the cultural resource management plan. Tom was an archeologist by training and had been part of the early staffing at Knife River (Park Archeologist from July, 1976, through August, 1977). The Rocky Mountain Regional Office took the lead in writing the natural resource management plan. We were to find that many of the National Park Service approaches to managing resources were developed on the assumption that you "never know" where your cultural resources are. For example—a cardinal rule for all management actions is that if you disturb the ground, you need to follow a specific process to assure that archeological materials are not destroyed, or are at least taken into consideration during planning. That seems simple and straightforward, but for Knife River where we knew because of the research program that the lower floodplain was void of any and all archeological materials, could we then be free to manage the natural resources to maximize their potential? Could we develop nature trails there? Could we do prescribed burns? Could we cut, mow, spray the noxious weeds that had engulfed that area?

On the cultural side of the issues could we, because we had very specific knowledge of the archeological resources, take remedial action in anticipation of future crisis problems? For example, a local road that ran through the park was eventually going to have to be moved because the riverbank was rapidly eroding into the right-of-way. Severe erosional storms are commonplace in the Dakotas. We knew that any morning following a storm we could come to the park headquarters and not only not be able to get there but likely be faced with irate local ranchers who would demand that the road be relocated. The only place to move it would be onto the adjacent Big Hidatsa and Taylor Bluff sites. In this case, we did use archeological information to stabilize the riverbank which made the county commissioners very happy AND provided long-term protection for the Big Hidatsa site. Another example with which we struggled, and which was not resolved until Mick Holm replaced me, was how to use the resource information to identify and prioritize archeological resources outside park boundaries that were critical to the park story, particularly resources whose existence was threatened by non-National Park Service actions.

The revised cultural (approved May 11, 1984) and natural resource (approved February 2, 1984) management plans both ended up being useful tools that guided park management. If a cultural issue could be affected by a natural resource management action, e.g., a prescribed fire to control weeds, the action plans were cross-referenced so future managers would have complete and readily available guidance for their planning efforts.

To summarize the importance of the archeological program at Knife River is to simply say that it provided the fundamental information that allowed the National Park Service to take a site that was already nationally significant and to make it internationally significant. While that might seem an overstatement to many who may not even know where Knife River Indian Villages National Historic Site is located—I am absolutely convinced that at some time in the future the true depth and breadth of the park's significance will come forward as a result of completed and continuing research there.

SUPERINTENDENT HOLM

Managing the resources of Knife River is not unlike managing resources in other National Park Service areas. It is a delicate task of balancing the requirements of visitor use on one hand and the concerns of preservation on the other hand. The cultural and natural resource components that comprise this resource-rich park are central to the park's being. As natural resources lured Native American peoples to this locality in the past, it is the cultural resources that lure people today in quest of information about these early inhabitants.

The practice of being a good steward of the land makes it mandatory to have fundamental knowledge of all resource components in order to allow decision-making that is most beneficial and least detrimental to the very resources that the park was established to protect. Knowledge of the natural component helps us to better understand the parameters we must operate within when addressing cultural resource management issues, and vice versa. Both kinds of resources become inseparable from a manager's perspective and management of one kind must complement the other.

Knowledge of whether a resource, or any component of that resource, is unique enough to protect at all cost is absolutely vital to decision-making. The pivotal point to making that determination is having the information base available prior to decision-making. As a result of the Phase I research effort, we at Knife River possess an in-depth knowledge of the cultural component equal to few other national park areas. Research now underway will help us understand the natural resource component in a similar way.

The fields of interpretation, resources management, law enforcement, and maintenance make up the total management scope of a park. Successful implementation of each is built on an understanding of the resource base of the park. If we are to do our best in managing these functions, we must know what it is we are working with. The situation is analogous to looking at a map as we prepare for a trip. In order to determine how to get to a certain destination we need to know first where our starting point is. To make the journey as short and smooth as possible, it helps to know what we can expect along the route so that we can make ecomonical use of fuel and avoid delays and other pitfalls.

Since 1985, development at Knife River has moved forward on that journey at a rapid pace. We now are on the verge of completing a major visitor center project and associated trail system as well as major land acquisition. Research in the park's early years has led to an understanding of the park's archeological resources and built a strong foundation for planning and implementing subsequent actions like those now taking place. National Park Service-sponsored archeological research at Knife River began in 1976 and took the form of intensive survey and excavation as well as application of remote sensing techniques. From the managerial perspective, I view these purposes and their products as aids in the areas of protection, interpretation, and management of the resources.

The original, three-phase program was designed to 1) collect baseline resource information, 2) study information voids in our knowledge of resources, and 3) acquire specific information about the architectural forms that once existed in the park. The Phase I study, actually started in 1976, resulted in development of detailed maps photogrammetrically produced from aerial photographic coverage and other remote sensing techniques, artifact collections gathered under very controlled circumstances, knowledge of existing collections from related sites in the region, and detailed information on the nature and chronology of many of the park's archeological deposits. The 1978 research plan identified three explicit goals: 1) summarization of available archeological information and its relationship to the Knife River resources; 2) compilation of accurate site location and inventory data, including establishment of a chronology for sites in the Knife River Indian Villages and delineation of distinctions between Mandan and Hidatsa historical development in the archeological record; and 3) generation of detailed archeological data and records useful for both managerial and scientific purposes. Those goals have well been met.

Meeting Park Mandates

The first purpose to be served by this extensive program of on-site research was the identification of a National Park Service presence at Knife River. The activity of archeological crews working in the park brought a realization of the truly national significance of the park's archeological resources that few people outside the scientific community recognized. Not only did the research effort support the need for setting aside the park and protecting its resources but it provided the knowledge necessary for the Service to meet its own legislative guidelines and requirements, such as:

1) the Antiquities Act of 1906, which requires the protection, preservation, and public accessibility of historic, prehistoric, and paleontological resources on Federally-owned or controlled lands;

2) the Historic Sites Act of 1935, which makes it national policy to "preserve" for the public certain lands and their resources;

3) Presidential Executive Order 11593 (May 13, 1971; now codified in amendments to the National Historic Preservation Act of 1966) which clearly directs Federal Agencies to inventory their landholdings for prehistoric and historic resources; evaluate those resources for significance and possible eligibility for National Register; and nominate eligible properties to the National Register of Historic Places;

4) the National Historic Preservation Act of 1966, Section 106 of which requires Federal agencies to take into account the effects of their undertakings on any district or site included in the National Register or eligible for the Register;

5) the National Evironmental Policy Act of 1970, which requires Federal agencies to publicly disclose the impact of their actions on cultural and natural resources; and

6) the Archeological Resources Protection Act of 1979, which protects archeological resources on Federal lands and establishes criminal penalties for persons who appropriate or injure those resources.

Without a clear knowledge of park resources, meeting these mandates and adhering to legal mandates would be a virtually impossible task for Federal land managers.

Enhancing Cultural Relationships

Our research program has served as a bridge builder with the Native American community at Fort Berthold. The broadening of the park resources information base has brought closer ties with the descendants of the early inhabitants of villages that once existed within the present park boundaries and in the general region. As Indian people watch and see the archeological story unfold in virtual agreement with centuries-old oral tradition, there has been an increased awareness and interest by the Indian people in their heritage and in the park's archeological resources.

The archeological research program has also provided the necessary credibility the National Park Service needed to involve these people in the park's development, programs, and activities. This has resulted in the involvement of Indian people in the development of park management documents, design of facilities, review and collaboration on interpretive literature, and consultation on the content and design of museum exhibits and audio-visual programs.

Managing Museum Collections

An extensive archeological collection, numbering in the hundred of thousands of specimens, has resulted from the Phase I archeological research. The accountability of this collection through computer cataloging into the Automated National Catalogue System has been made easier with the fine detail of the archeological research records. This information, generated to serve field research and analytical purposes, has also facilitated the cataloging of the collection for accountability and curation purposes. The integration of field and museum data now provides an ease of accessing both collection information and objects, which promises to be of great use to future researchers.

Knowledge of the collection's size and scope, plus possession of a long-range research plan, has been of great value in planning facilities to accommodate the existing collection as well as meet future needs for additional collections (after all, continuing research is one of the purposes for which the park was authorized by Congress).

Managing the Historic Preservation Component

Work with the State Historic Preservation Officer (SHPO) and his staff on Section 106 compliance matters has been aided immeasureably by having complete data on the park's cultural resources. Information from the research program was essential in development of the supporting documentation for the National Register nomination in 1986 which identified 56 sites within the park. Originally, when the park was established only four archeological sites were believed to exist within the park's boundaries and to meet National Register eligibility.

Through the well-organized data of the research program, we are also able to quickly access site maps, research documents, and descriptions in order to determine the effect of an undertaking. By relying on site maps and detailed descriptions of resources, it has proven immensely easy to expedite the 106 process for non-site areas and for site areas, to avoid impact altogether or design appropriate mitigation strategies.

Managing the Interpretive Function

Archeologically, these village sites are outstanding, surviving physical vestiges of a widespread aboriginal culture that dominated this region for a millenium. Historically, there is an unparalleled wealth of narrative and pictorial information that abundantly documents the culture and appearance of the native peoples who once lived at and around the mouth of the Knife River. Together, the archeological and historical records provide unique opportunities to develop a truly outstanding interpretive program for the park. Several broad interpretive themes were suggested in the original 1968 feasibility study for the park, and they reflected the state of knowledge at that time. However, the tremendous advances in knowledge that have resulted from the Phase I archeological and ethnohistorical studies will allow those themes to be revised and refined, often to a major extent, and totally new interpretive messages to be formulated as well. Steps have already been taken in this direction with the publication in 1989 of *The Mouse Raid* (Ward et al. 1989), a traditional Hidatsa story about how young boys acquire the skills to become successful warriors, hunters, and providers as adults in Hidatsa society. The prehistory and early history of the Hidatsa Indians—essentially a lay synthesis of the information presented in this volume—is told in a short book entitled *People of the Willows*, jointly prepared by the University of North Dakota and the Midwest Archeological Center and published by the University (Ahler et al. 1991). Thanks to the Phase I research program, the interpretive possibilities for the Knife River Indian Villages are constrained only by the limits of human imagination, not by the subject matter that is contained in the ground or in musty documents reposing in archives.

Protecting Non-Federal Resources

A number of important archeological resources have been identified on non-federal lands outside the boundaries of the park. Several of these resources are under the threat of imminent destruction or long-term degradation from land-use practices of area residents. In 1987 the North Dakota State Historic Preservation Office took legal action to prevent further destruction of one such resource known as the Stanton Mound Group. Previous archeological research has revealed significant evidence of predecessors of the Mandan and Hidatsa peoples at this Woodland-period site. Several sites within and near the Knife River Indian Villages also contain some components of this period. However, this site predates the Plains Villagers and represents people with a different form of adaptation to the Plains environment. Using knowledge gained from the Phase I research, the National Park

Service was able to justify the need to include the mound group in the National Historic Site as a valuable addition to the cultural resource base of the park. In Congressional hearings to bring Federal protection to these resources, we were able to enhance our position by referring to the documented research of the Phase I program.

Managing Park Development

During the planning of structures and trails, basemaps of cultural resources were used to lay out development plans. Decisions were tempered by the need to insure the least impact to the park's cultural resources. Our ability to make sound decisions was influenced by our knowledge of park resources acquired by the Phase I studies. As a result, ground disturbance has been kept to a minimum while development of park facilities took place.

The decision on the location of the permanent park visitor center was based largely on detailed knowledge of artifact density and distributions. As work proceeded, only a small amount of cultural material was discovered and disturbed, exactly as expected by the archeologists, yet access to and use of the building site did not have to be compromised. Looking at archeological basemaps developed during the Phase I research, we were able to lay out an access trail to two major village sites that caused no harm to those resources.

Had not the visitor center planning been preceded by evaluative archeological investigations as part of the Phase I research, I believe mitigation cost for the visitor center project would have been astronomical. Because we are mandated to preserve the cultural resources in our charge and provide for their long-term use and enjoyment, we must carefully make decisions about those resources that entail the least possible impact.

Conclusion

I have tried to briefly reflect on the practical side of the importance of archeological resource inventory and its application to park management. I am convinced that proper care of the resources the Service has been mandated to protect cannot be adequately accomplished without a systematic research program that provides baseline data on what it is we have been given to preserve and manage for future generations of Americans. Inventories to identify both natural and cultural resources are paramount to developing a long-range management program.

Archeological research has been of great benefit to Knife River Indian Villages in the fields of planning, development, and land acquisition. In the future it will continue to play a key role in developing interpretative programs, cross-cultural bridge-building, and preservation. The research data have direct application to management, interpretation, law enforcement, resources management, and maintenance. Hardly a day passes that the archeological research data are not used or consulted in some facet of park operations.

I believe that the research program developed for this park has served us well. While the Knife River Indian Villages National Historic Site is fortunate to possess a rich archeological and historical resource base, many of the lessons and approaches of the Phase I research program for Knife River can be profitably applied to other units of the National Park System.

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CHAPTER 27

ARCHEOLOGICAL RESEARCH AT KNIFE RIVER: RETROSPECT AND PROSPECT

Stanley A. Ahler and Thomas D. Thiessen

It is clear from a reading of the legislative history of Public Law 93-486, the 1974 law which authorized establishment of the Knife River Indian Villages National Historic Site, that Congress intended research to be one of the purposes to be served by the park, along with preservation and interpretation of the park's archeological resources. Consequently, with completion of the Phase I research program and the availability of the results of that program, it is appropriate to reflect on the contributions to knowledge made by the Phase I research. It is also appropriate to reflect on questions raised by that research and to reformulate and plan the objectives and methods for succeeding research in the park and at sites outside the park that are important to the park's story. To that end, this chapter will identify a number of important research objectives and tasks that should be undertaken, either singly as opportunity permits, or in combination as a planned, integrated program of research implemented by the National Park Service.

Field investigations of the Phase I archeological research program for the Knife River Indian Villages National Historic Site lasted six consecutive seasons, from 1976 through 1981. Additional fieldwork was conducted in the park intermittently between 1981 and 1988, most notably the 1983 mitigative investigations at the Taylor Bluff site, which greatly illuminated a poorly understood and somewhat enigmatic—but highly significant—archeological resource within the park. Most of the archeological work was conducted by the University of North Dakota, but important parts of it were also carried out by researchers from the National Park Service, the University of Nebraska, the University of Missouri, and several other institutions of higher education. The archeological research was augmented by important ethnohistorical studies conducted by W. Raymond Wood of the University of Missouri, and his students and associates (see Chapters 11-16, this volume).

Concurrent with the Phase I and later investigations in the park were important studies conducted at nearby, related archeological sites in the region, such as White Buffalo Robe, Flaming Arrow, Slant Village, the sites inventoried on the Cross Ranch, and the Knife River Flint quarries in Dunn County. These related investigations were directed by the same principal investigator who guided the Knife River Indian Villages research program, Stanley A. Ahler; employed many of the same key personnel who also participated in the Knife River Indian Villages research; and utilized much the same theoretical, methodological, and procedural approaches that were used at Knife River. The end result is that these several research undertakings closely complement each other, a circumstance that rarely happens in the case of less intensive, less synchronized research endeavors.

The sum of this research has resulted in a considerable advance in our understanding of the archeology and culture history of what is herein termed the Knife region of the Middle Missouri subarea, and in particular, of our knowledge of the occupation of the region by the Hidatsa and Mandan Indians and their prehistoric ancestors. Most of this work is summarized and synthesized in this volume, along with the results of the ethnohistorical research conducted concurrently with the archeological investigations. This research has answered, or has begun to answer, many important questions long asked by researchers.

We now know, for example, that the Hidatsa and Mandan Indians experienced a long and complex history of intercultural interaction in the Knife region. We have begun to distinguish separate ceramic traditions for each of these peoples, and to understand when and how these peoples interacted with each other over the centuries in terms of interborrowing certain elements of their respective pottery-making traditions. This in turn has augmented our understanding of the general interrelationships among these two peoples at different times, i.e., knowledge of which group was culturally dominant in the region at different times, and which group more greatly influenced the other at various times in the past, at least in terms of material culture. This has led to a marked revision of previously accepted concepts of cultural dominance, or at least prominence, among these peoples. We now believe that the Mandans, once powerful, influential, and vastly numerically superior to their neighbors the Hidatsas, became by the close of the eighteenth century virtual cultural refugees among the more numerous and flourishing Hidatsas in the face of Sioux military pressure and relentless devastation of Euroamerican diseases. This transformation is documented most clearly by the Mandans' adoption of the Hidatsa pottery-making tradition by AD 1800. This view of the changing fortunes and alliances of the Mandans, based largely on archeological research at Knife River, contrasts markedly with depictions of the village tribes reflected in the historic record left by early Euroamerican visitors to the region, in which the Mandans are consistently, and with little change, portrayed as the more dominant people and the Hidatsas are little visible. A detailed understanding of the full scope of cultural change among the Mandans, really only hinted at through the research at Knife River, remains one of the most fascinating areas for study in Plains Village archeology in the future.

We have learned to study the Hidatsas by attempting to unravel the separate histories and archeology of the three subgroups of the Hidatsa tribe—the Awatixas, the Awaxawis, and the Hidatsas-proper. Alfred Bowers provided the necessary clues for this in his pioneering archeological and ethnographic studies of the Hidatsas during the first half of this century, but for various reasons, his work met with little acceptance among his peers in the archeological discipline until recently. Viewing the archeological remains of all three Hidatsa subgroups as a single archeological complex, and lumping them with somewhat similar remains left by the Mandans, often frustrated earlier archeologists working in the region. These archeologists usually have concluded that it is impossible to distinguish Mandan from Hidatsa village sites, or Mandan material culture assemblages from those created by the Hidatsas. Adopting Bowers' view of the Hidatsas as three related but distinct groups of people with separate histories and traditions, the Phase I research at Knife River, complemented by studies of related sites utilizing the same research approaches as at Knife River, has allowed us to begin to distinguish differences in at least some aspects of Mandan and Hidatsa material culture. This research is just beginning, but cannot proceed much farther without acquisition of better controlled archeological data from traditional Mandan sites—data comparable in scope and detail to the data now available from Knife River.

The approach followed in Phase I research, that of developing and interpreting the archeological record with a strong emphasis on Hidatsa subgroup distinctions as identified in oral traditions, can be used as a theoretical and methodological model for how archeologists might more productively study the prehistory of both the Mandans and the Arikaras. Research at Knife River clearly indicates that ceramic variation in the archeological record may be much more closely linked to subgroup association than to absolute temporal position within a ceramic tradition. This discovery calls into question the meaning and value of ceramic seriation and related chronological ordering systems based on pottery typology, used routinely with little question by many archeologists. The approaches followed at Knife River, grounded in the assumption that inter-village variation may be as important as inter-regional variation or inter-tradition variation, should guide the way to new and more productive avenues for investigation, or reinvestigation, of regional culture-historic sequences and cultural change, and changing social organization among all Northern Plains village groups.

The Phase I and related research in the Knife region has also led us to the conclusion that the archeological and traditional records of the Hidatsa and Mandan Indians complement and reinforce each other to a degree previously unsuspected. Perhaps the most remarkable incidence of the convergence of these two separate records is that provided by the Flaming Arrow Village site which figures in Awatixa tradition as the earliest Awatixa village. Coincidentally, archeological excavations there have revealed it to contain virtually unique ceramic and architectural remains and to be the earliest dated village yet known in the region. By no means is the Flaming Arrow occupation well known archeologically, however. The very limited excavations conducted there have yet to be fully analyzed and compared to other Hidatsa and putative-Hidatsa manifestations in the Knife region, as well as the enigmatic Menoken Village located some distance east of the Missouri River valley.

The Phase I and related research accomplishments have also revealed that Northern Plains tribes were subjected to influences from Euroamerican culture much earlier in time than previously believed. By AD 1600, only little more than a century after Columbus' landfall in the Caribbean, Northern Plains villagers may have been using tools of Euroamerican manufacture and suffering from epidemic diseases introduced by the Euroamerican newcomers to the New World. These influences took place for a very long time prior to actual contact with Euroamerican individuals, and probably caused greater changes in native lifeways and demography than previously realized. Accordingly, we now realize that native societies as portrayed by La Vérendrye, Lewis and Clark, Maximilian and Bodmer, Catlin, and other eighteenth- and nineteenth-century visitors, were far from being cultures isolated from and unchanged by Euroamerican penetration of the North American continent. The research at Knife River and elsewhere has led us to understand that native cultures of even the eighteenth century must have changed considerably from what they were like before the arrival of Euroamericans in North America. This realization shifts the focus, more than ever before, towards the use of archeology as the primary investigative tool for portraying the spectacular features of the Plains Village lifeway at its apex.

The culture-historic scheme developed in this research for the Knife region is unique in many ways, foremost among them being the wealth of chronometric information incorporated into the scheme as well as the breadth of the material culture and other data sources on which it is based (incorporating ceramic, lithic, trade artifact, stratigraphic, and historical information). This scheme is far more than a classification system, however, into and against which new components can be pigeonholed or compared. It is a working synthesis of the cultural dynamics of several related groups of people, tracking the ebb and flow of cultural forces impinging on these peoples, and their changing fortunes as perceived from the geographic perspective of Knife River. It is the saga of Hidatsa being, viewed from the archeological and historical perspective. It may well stand as a model for the kind of culture-historic reconstructions we would like to develop for other regions, central to Mandan and Arikara being, in the Middle Missouri subarea.

Many of the results and methods of the Knife River Indian Villages Phase I research program can be fruitfully applied in other parts of the Middle Missouri subarea outside of the Knife region. For example, the Phase I research has led to considerable revision of the taxonomic sequence for the culture history of the region, one that departs radically from the taxonomic model proposed by Lehmer which has found widespread acceptance and application by areal researchers. Lehmer's model was developed on the basis of data from the southern part of the Middle Missouri, and does not fit well with the data generated from the Phase I research in the Knife region. Consequently, it was necessary to drastically overhaul Lehmer's cultural sequence for the region and replace it with a taxonomic framework that permits much more fine-grained interpretation of the history of the village tribes that resided in the region, particularly the Hidatsas. The taxonomic model developed out of the Phase I research could well be applied to reassess, revise, and refine the Lehmer-based understanding of culture-historical sequences in the other regions of the Middle Missouri.

It is thought that the Knife River Phase I program will also stand well as a model in methodological advances in the field and lab. For example, the value of consistent, fine-screen field recovery, capable of capturing the smallest metal and glass trade artifacts as well as residues from important native technologies, has been demonstrated beyond question, and efficient lab methods have been developed for handling the wealth of information procured by such field procedures. Studies of temporal change in the amount and composition of metal trade artifacts, glass trade beads, and chipped stone raw materials from diverse source locations have provided benchmark data sets against which other regional data sets, if collected in comparable fashion, can be compared. Based on Phase I research, it now seems reasonable that village components up and down the Missouri trench might someday be dated relatively accurately with reference only to trade artifact composition and density, without recourse to ceramic or chronometric information, if appropriate samples can be obtained through controlled, fine-screened excavations.

Another area of methodological and interpretive advance clearly demonstrated by the Phase I program lies in the attribute-based study of pottery collections. This approach, and the multivariate analytic techniques applied to the resulting data sets, have allowed researchers to take a multi-dimensional view of long-term ceramic change in the Knife region. Researchers have been able to sort out the somewhat independent contributions attributable to the interplay of two competing and interacting ceramic traditions, intertwined with the effects of more superficial influences in pottery decorative patterns impinging from outside source locations at various times in the archeological record. The ceramic coding system developed for Knife River will probably stand for a long time as a methodological model which can be fruitfully modified or expanded for application to ceramic collections up and down the Missouri valley.

From the perspective of National Park Service land managers, the Phase I research program has greatly expanded knowledge of the park's archeological resource base. Ninety-three percent of the lands within the park's original, authorized boundary have been subjected to a fine-grained, intensive examination utilizing a variety of survey techniques suited to differing relief and vegetative conditions. From a base of four sites known when the park was authorized in 1974, the research program has expanded the total inventory to 56 known sites lying wholly or partially within the park boundary. Not only are these resources known to exist, but park managers now have a good understanding of their spatial extent, the age and character of deposits at many of them, including all of the major villages, and the significance of most of them with respect to the prehistory and history of the region. The intensity, thoroughness, and rigor of the archeological inventory investigations at Knife River Indian Villages have seldom been matched elsewhere in the National Park System. Similar fine-scale research methods and approaches, applied with similar thoroughness and rigor, can profitably be used to inventory other locales within the Knife and adjacent regions in order to achieve similarly detailed levels of information.

Despite the many invaluable ways in which the Phase I and related research has contributed to knowledge of the prehistory, history, and archeology of the Knife Region, many important questions about Native American occupation and utilization of the Missouri River valley in North Dakota remain to be answered, or, in some instances, even asked. Some of these questions can best be answered by continued focus on existing collections from sites within the park or by expanded research at those sites. Among these are the following:

1. Very little is known about pre-Village occupations in the park and the region. Expansion of the park boundaries to the north and incorporation of the Stanton Mound Group and related cultural resources into the park offers the opportunity to conduct significant, ground-breaking research with such resources. As noted above, cultural resources in this northern tract should be inventoried with thoroughness equal to that applied throughout the remainder of the park. In addition, sites in this northern tract should be further evaluated through archeological test excavation, magnetic survey, and geologic studies. Two additional avenues of research, linked directly to resources in this part of the park can be recommended:

2. The cultural origin, temporal placement, and function of the linear mound complexes in the region remain basically unknown; the Stanton Mound Group and other nearby non-mound sites within the park should become the focus of studies dealing with these topics. Based largely on survey information from Cross Ranch, it has been hypothesized that the linear mounds were constructed during the Late Woodland period, and that they are functionally, symbolically, and ritually linked to use of nearby bison procurement locations. These ideas remain to be tested or even fully developed. Mound construction and use by earlier Woodland groups and also by ancestral Hidatsa villagers remain viable, untested possibilities and should be investigated using park resources as a beginning point.

3. Preceramic age, Plains Archaic components in the park should be more intensively studied. Significant components occur at the Scovill and Elbee sites and are expected to be represented at sites in the newly acquired park addition to the north. In all of these sites cultural remains are found within stratified alluvial and eolian sediment sequences. Studies of these sites could focus on changing adaptations to local and regional resource bases (bison, other more diversified plant and animal resources, and Knife River flint) within the context of regional environmental or climatic change.

4. Understanding of architecture and settlement organization for the Hidatsas remains virtually unknown except during the period of historic documentation. This topic deserves special study. The transition from the rectangular to the circular house form can perhaps be documented at resources within the park. Sites such as Youess within the park contain shallow but extensive deposits which through combined application of magnetic survey, coring, and hand excavations, could reveal important data on architecture and community plan. Potentially contrastive architectural data for the Awatixas and the Hidatsas-proper, particularly for the AD 1600s, could be obtained through synchronized and comparative excavations at Lower Hidatsa and Big Hidatsa villages. Additional testing would be required at Lower Hidatsa to identify the subpart of the village where such studies could be most productively focused. Present data suggest that such excavations

would focus on the northern periphery area within Big Hidatsa Village.

5. The Elbee site remains a major enigma. The material culture at the site is dissimilar to anything in the park, and seems to derive from a place of origin in South Dakota. A more representative sample of artifacts is needed from the site, along with additional information about settlement plan and architectural remains before the Elbee site and its importance can be placed in context within the park culture-historic sequence.

6. The tantalizing and highly significant information available from salvage excavations at Taylor Bluff village needs to be augmented by more representative sampling of the site and by extensive excavation in other parts of the village. Such excavations should also focus, like those at Elbee and the Scattered Village phase sites, on gathering community plan and architectural information along with additional artifact recovery.

7. Excavations in all of the locations noted in points 4 through 6 should be integrated into park visitation and interpretive programs. In most of the areas suggested for excavation, deposits are shallow and a relatively modest excavation effort, in terms of time and people, could result in substantial exposures visible to park visitors for purposes of interpretation. An ongoing, planned, multi-year summer excavation program would provide an invaluable complement to interpretive programs during the park's peak visitation season. Such a program could be developed through cooperative agreements between the NPS and institutions of higher education. In such an arrangement, much of the cost of fieldwork could be borne by the educational institutions through student training programs, while NPS funding could be focused on analysis and interpretive components of the program.

8. Existing artifact collections warrant substantial additional study. The lithic technological systems being used by the villagers could be elucidated by integrating study of the park collections directly with data coming from the Knife River flint quarries in Dunn County to the west. For example, studies at the flint quarries clearly indicate that bipolar flaking, one of several modes of lithic reduction, suddenly became popular during the Late Prehistoric period (Plains Village period). Precisely why this occurred, and to what end, cannot be answered at present, but the answer lies in the study of villages such as those at Knife River where the products of the quarries (particularly flakes and flake tools) were transported, used, and discarded. Did the Hidatsas at Knife River participate in this "bipolar phenomenon," and, if so, in what manner, and if not, why not? If not (and data collected so far show little presence of bipolar technology), then the more intriguing question of who was responsible for this activity remains.

9. The idea that one or more of the villages at Knife River somehow controlled the production, transport, and exchange of Knife River flint from quarries just to the west is a longstanding one, but one which has barely been touched in the Phase I research. At this time we simply have documented the massive amount of Knife River flint debris occurring in several villages, particularly at Lower Hidatsa. The role that the villages played in the lithic production system centering on Knife River flint during the past few hundred years can be elucidated considerably by further study of the flint artifacts in the village sites. Trace element studies linking the flint to known quarry sources and a fuller understanding of the complete lithic production and discard process occurring in the villages would be essential in such research.

10. Studies of pottery collections, in the context of oral traditions, indicate that the Hidatsa subgroups each left separable and distinguishable archeological records. This subgroup comparison needs to be expanded and intensified by looking more closely at many other classes of material remains. Oral traditions and various ethnographic interpretations indicate that the Hidatsas-proper maintained a much more nomadic lifeway than the Awatixas, even long after both groups were settled in permanent communities at Knife River. If this is true, we would expect strong differences in resource use patterns, especially in the realms of hunting, horticulture, and plant food gathering, and in the realm of lithic resources as well. Phase I research has begun to isolate some very obvious between-village contrasts (Chapters 17, 18, and 19, this volume), but has barely touched on an explanation. All of these subjects could be explored through additional research with extant, controlled collections from comparable time units at Big Hidatsa and Lower Hidatsa villages.

Many other avenues of research need to be studied which bear on interpretation of the Hidatsa archeological record at Knife River, but which would draw primarily on data sources outside the park proper. Some of these studies would draw upon analysis of existing collections, using methods and procedures developed at Knife River, and others would involve new fieldwork and follow-through analysis and interpretation. Among these, the following topics can be enumerated:

11. The focus on a better understanding of linear mound groups and Archaic period cultural developments could be pursued at out-of-park resources, as well as at in-park sites. Linear mound groups amenable to further study are scattered from Square Buttes upriver to well upstream of Garrison Dam. Many other stratified preceramic-age sites exist along the Missouri in the Knife region, but few have been documented. One important location deserving of urgent attention is site 32ML143, presently eroding into the Missouri River directly across from the mouth of the Knife.

12. The Flaming Arrow site, highly important to interpretation of Hidatsa origins (and perhaps Plains Village origins, in general), remains poorly understood. The extant collection from the site needs to be reported, the remainder of the partially excavated house at the site needs to be completely excavated and reported, a second house at the site should be sampled or excavated, and the locality surrounding the site needs to be examined carefully for evidence of fortification systems and mortuary locations to further test the link between this site and the Awatixa origin tradition.

13. Related to this point, the Menoken site, on Apple Creek east of Bismarck, warrants substantial additional research. Of all recorded sites along the Missouri River, Menoken most resembles Flaming Arrow. The collections from Menoken need to be restudied, the excavated house at the site needs to be reopened and chronometric samples recovered and dated, and additional excavations should be conducted using modern recovery procedures. A comparative study of Flaming Arrow and Menoken artifacts should be conducted. A survey should be conducted, particularly on the east side of the Missouri River in the Knife and Heart regions, specifically to locate and better understand Charred Body complex and Woodland period manifestations in that part of the valley.

14. The Middle Missouri complex remains poorly understood in the region, with components in this complex having been subjected to extremely minimal controlled excavation. Understanding of this complex is essential to a more complete understanding of early Awatixa cultural developments and earliest interaction between Awatixa and supposedly resident proto-Mandan villagers. This complex can best be studied at Clark's Creek and, most importantly, at the Stiefel site, just west of the park on Knife River. New excavations should be conducted at these sites, focusing on recovering a full array of material remains and architectural information.

15. The population expansion hypothesized to have occurred in the period AD 1300-1450, and the abrupt collapse immediately thereafter, warrants a large research program extending well beyond the park. Such a program could have several components. One should focus on better documentation of this hypothesized expansion using a data base developed from outside the region. We would predict the spread of horticulture and farming peoples well into the lower reaches of the Yellowstone River valley, the Little Missouri valley, and perhaps into the Souris River drainage and parts of southern Manitoba during this period. Surveys should be conducted in those regions to verify the presence or absence of horticultural communities in the predicted time range. A credible chronometric program should be pursued to date any horticultural communities located in these regions. Detailed comparative ceramic studies should be pursued to clarify linkages between farming communities in widespread locations during this time period. This would include a further study of existing and perhaps newly excavated collections from the Hagen site and the Nollmeyer site in eastern Montana and other suitable locations. Epidemic disease is only one of the possible causal factors linked to the projected regional population decline after AD 1450. The role of climatic change in population movement in the region north and west of central North Dakota needs to be researched in detail. Such work should focus primarily on development of pollen records from suitable natural trap locations within the broader region, augmented by studies of geology, vertebrate and invertebrate microfaunal remains, and pedology. It is likely that climatic change was the driving force for the expansion of horticulture into the northern latitudes, and was also the driving force for the initial collapse of human populations in those same regions, with epidemic disease only later becoming a primary causal variable in population change.

16. The study of architecture and architectural change in the region remains a topic for active research. This work should focus on development of comparative data from

Scattered Village complex and Heart River complex sites in the Knife region. Much of this research could focus on village sites preserved at the Cross Ranch Nature Preserve and at locations adjacent to the ranch.

17. The hypothesis that Wisconsin is the place of origin for some of the historic Hidatsa peoples (Hidatsa-proper and Awaxawi subgroups) has been proposed in this volume but has hardly been tested. This hypothesis is presently supported by only a cursory review of literature in the Wisconsin area, brief study of published ceramic data from the Wisconsin region, and communications with a small number of researchers actively working in the Wisconsin area. The question of the origins of Knife River ware, central to this hypothesis, needs to be much more rigorously investigated. The prehistoric antecedents of similar, braced-rim wares manufactured by the Arikaras (Stanley ware) and by the Cheyennes need to be studied, and the technological and stylistic relationships between Hidatsa, Arikara, and Cheyenne pottery making need to be clarified. Extensive first-hand research with extant collections from the wild rice district in Wisconsin needs to be conducted. Dating of potential ancestral Hidatsa complexes in Wisconsin needs to be clarified. Most importantly, a systematic examination of collections and site records from the state of Minnesota, a region lying directly along the migration route from Wisconsin to North Dakota, needs to be conducted. If such efforts fail to reveal material remains which can be credibly associated with early, westward-moving Hidatsa groups, then the hypothesis of Hidatsa origins in the wild rice district may have to be modified considerably.

18. The oral traditions for the Awaxawi subgroup of the Hidatsas set them apart as an ethnic unit distinct from the other two Hidatsa subgroups, one that has a long history of residence near and interaction with the Mandans at Heart River. Awaxawi subgroup traditions lead us to specific sites related to Awaxawi occupation. Most critical here is Eagle Nose Butte, purported to be the site of an Awaxawi village prior to their move upriver to Molander Village. Excavations should be conducted at Eagle Nose Butte, specifically to date the site, clarify the ceramic content of the site, and reveal its potential position as the earliest Awaxawi settlement in the Missouri valley. It is at this location we would expect to find material remains most like those in yet earlier Awaxawi settlements to the east in Minnesota or Wisconsin.

19. Many previous site excavations and associated large, extant site collections should be studied and reported. Several can be noted which have direct bearing on interpretation of Hidatsa archeology, foremost being the Lehmer excavations (1970-1973) at Bagnell Village (Scattered Village phase and Mandan Lake phase?), the SHSND excavations (1968) at Alderin Creek (Hensler phase) just downstream from the park, and the Lehmer excavations (1969) at the Boley site (proto-historic Mandan, Heart River phase) just upstream from the mouth of the Heart River. A number of smaller collections also exist which need to be located, inventoried, and subjected to limited analysis. Included among these are William Duncan Strong's collections at the Smithsonian Institution (which include collections from sites within the park), excavated prior to World War II; Alfred Bower's collections from the 1920s, 1930s, and 1940s, housed at the Illinois State Museum; and the State Historical Society of North Dakota collections made at a large number of sites, primarily by George Will and Thad. Hecker.

20. A long-range program for updating our understanding of Mandan culture history should be implemented. This should be based in part on detailed study of extant ceramic collections from Heart region sites at the SHSND, but most particularly, on renewed, carefully designed excavations with modern recovery procedures at traditional Mandan villages near Heart River. A prime target would of course be Double Ditch Village, but others somewhat less prominent such as Motsiff, Larson, Slant, Ward, and Sperry should be tested. This work should focus on developing much of the same kinds of baseline data as have proven useful in the Phase I park program: detailed chronometric information and detailed information on ceramics, lithic assemblage composition, and, particularly, trade artifacts. Excavations should avoid within-house contexts, instead focusing on the most extensive stratigraphic records obtainable from village midden dumps. Interpretation of the recovered information should be made in light of all available data about Mandan origin traditions, using the Hidatsa research at Knife River as a model for this investigative approach.

21. The Mandans and Hidatsas were not the only village tribes to reside in the Knife region. The Caddoan-speaking Arikaras had a long history of interaction with both the Mandans and the Hidatsas, having intermittently resided in the region in the late eighteenth and early nineteenth

centuries and having permanently lived there after settling at the Fort Clark Village in 1838. A similarly comprehensive program should focus on a revised understanding of Arikara prehistory and culture history. Unfortunately, most early Arikara settlements have been inundated beneath man-made lakes for a number of years. Many protohistoric Arikara sites, key to understanding post-contact cultural developments, are presently and only temporarily out of water along the Oahe Reservoir in South Dakota. These newly re-exposed sites, soon to be re-inundated or destroyed (or both), should be test excavated at the earliest opportunity using modern fine-screen recovery techniques for purposes of obtaining, in particular, trade artifacts which may prove key to developing a chronological model independent of ceramic remains. Interpretation of the new data should closely integrate data from existing ceramic collections, traditions regarding subgroup divisions among the proto-Arikara populations, and independently developed chronological information.

22. An important problem that has received relatively little previous attention from archeologists is that of Hidatsa-Crow connections. Traditional/ethnohistorical and linguistic evidence attests to the fact that the Hidatsas-proper and at least one part of the Crow tribe, the so-called "River Crows," were once the same people. A second subgroup of the Crows, the "Mountain Crows," are also thought to have split off from early Awatixa Hidatsa populations. Although the evidence for the Crow-Hidatsa "schism" has been comprehensively reviewed by Wood and Downer and by various scholars at a 1979 symposium convened by the Montana Archaeological Society (see the papers published in *Archaeology in Montana*, Vol. 20, No. 3, September-December 1979) and small amounts of pottery from Wyoming and Montana have been attributed to the Crows, detailed comparative studies of documented Hidatsa archeological materials and putative Crow artifacts are lacking. The Hidatsa villages at Knife River provide a logical perspective from which to seek and assess archeological evidence for the Hidatsa-Crow separation. Such a study should entail a detailed review and assessment of linguistic, ethnohistorical, and traditional evidence on the matter, and, particularly, detailed analyses of collections from Hagen, Nollmeyer, and other sites outside the Missouri valley proper that may represent Crow/Hidatsa settlements at some point in the prehistoric transition between the two groups. Perhaps the Crow-Hidatsa separation was somehow a part of the population expansion hypothesized to have occurred in the Knife River circa AD 1300-1450 and the population decline which occurred immediately thereafter.

These and many other questions can be fruitfully answered by further archeological investigations at the Knife River Indian Villages and at other key sites in the Knife region. The Knife River Indian Villages archeological research program was originally planned to consist of three phases spanning twelve years. Phase I, inventory, reconnaissance, and establishment of the park's data base, required six seasons of fieldwork and is essentially completed with the printing and distribution of this volume. Phases II and III, comprising intensified test excavations and major excavations as well as continuing analysis, interpretation, and living or experimental archeology programs, respectively, were not implemented for lack of funding. In keeping with the mission of the National Park Service in preserving, interpreting, and studying the spectacular and irreplaceable vestiges of the prehistoric and historic past at the Knife River Indian Villages, Phase II research objectives and methods should be reformulated by the Service and appropriate funds should be programmed to implement Phase II. This should be done as quickly as possible because villages and other archeological sites of key importance to answering questions bearing on the Knife River story are increasingly being destroyed by looting, gravel quarrying, land development, reservoir operation, and agricultural activities throughout the Knife region and the Middle Missouri subarea in general. Boley and Larson Villages are examples of important and irreplaceable resources that have recently been destroyed or severely damaged, and their loss to the archeological record is by no means a unique occurrence. Further archeological research along the lines outlined above should be conducted as soon as possible while the resources necessary to answer specific research questions still survive the onslaught of time and the hand of man.

REPORT CERTIFICATION

I certify that "The Phase I Archeological Research Program for the Knife River Indian Villages National Historic Site, Part IV: Interpretat of the Archeological Record" has been reviewed against the criteria contained in 43CFR Part 7 (a)(1) and upon recommendation of the Regional Archeologist has been classified as available.

Regional Director

3/2/94
Date

Classification Key Words:

"Available"—Making the report available to the public meets the criteria of 43CFR 7.18 (a)(1).

"Available (deletions)"—Making the report available with selected information on site locations and/or site characteristics deleted meets the criteria of 43CFR 7.18 (a)(1). A list of pages, maps, paragraphs, etc. that must be deleted for each report in this category is attached.

"Not Available"—Making the report available does not meet the criteria of 43CFR (a)(1).

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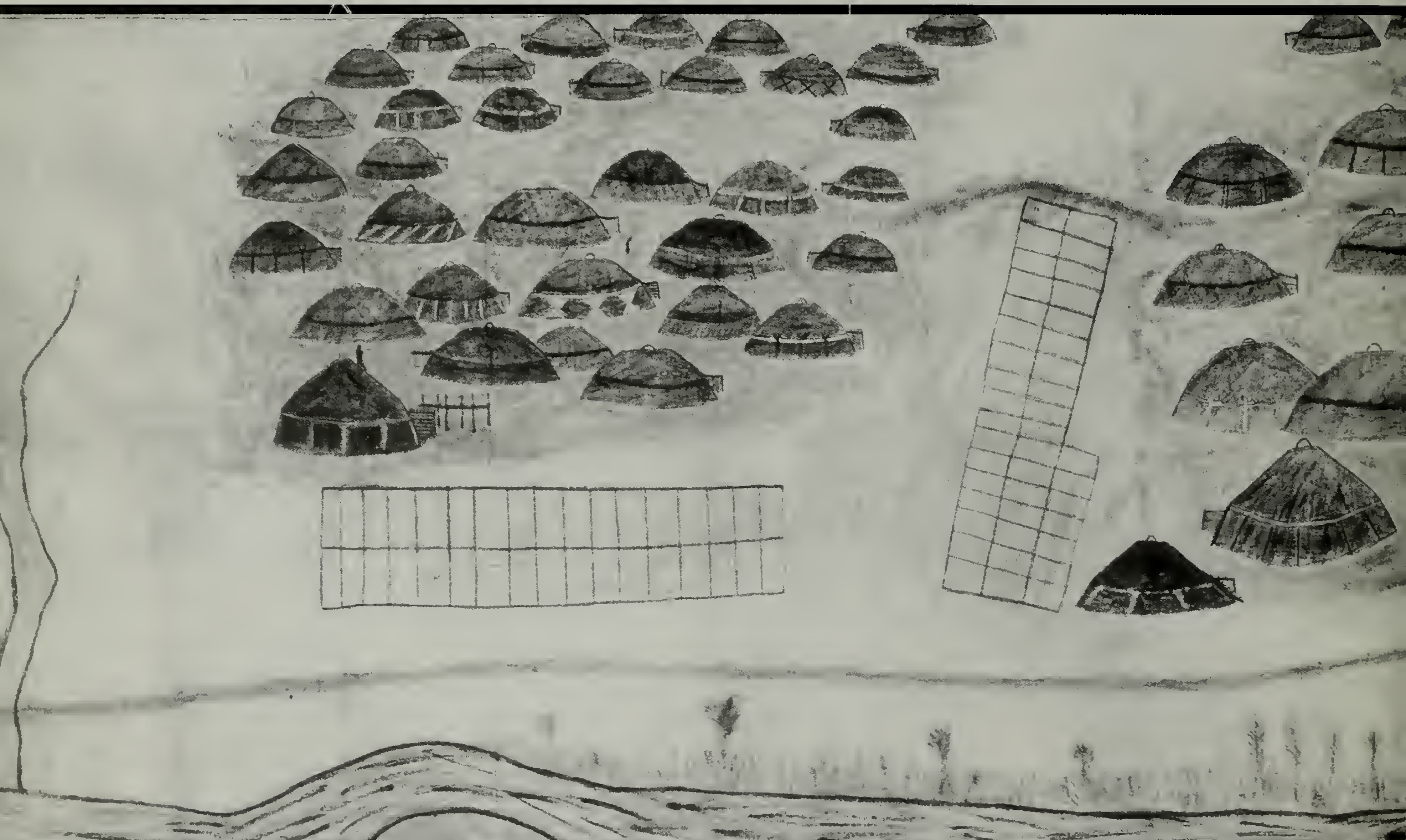

Painting of the three historic Hidatsa villages at the confluence of the Knife and Missouri rivers, North Dakota, made in 1904-1905 by Sitting Rabbit, a Manda
Indian. Courtesy of the State Historical Society of North Dakota (accession number SHSND 673).